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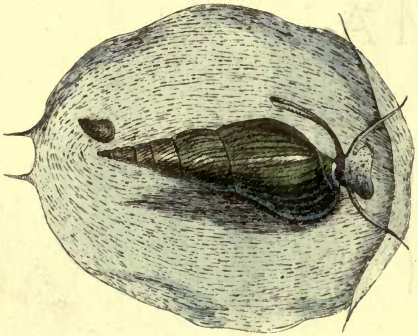

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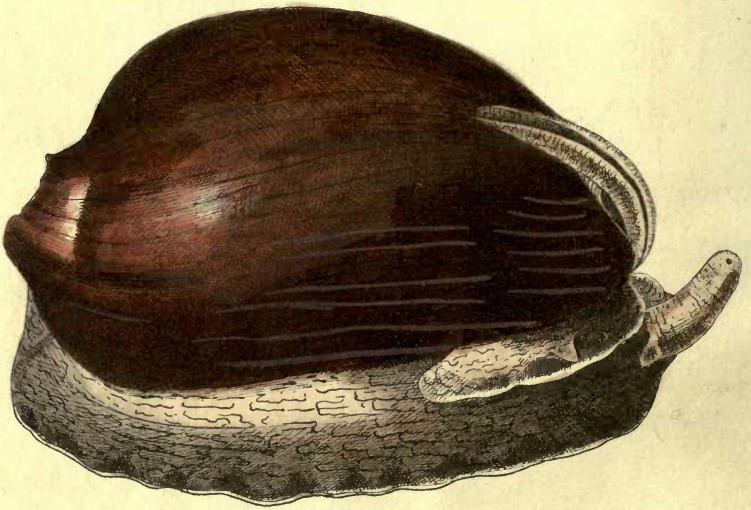

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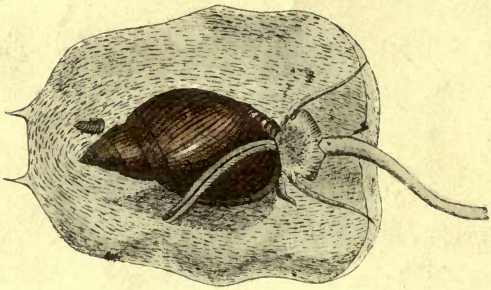

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MANUAL

OF

CONCHOLOGY;

STRUCTURAL AND SYSTEMATIC.

WITH ILLUSTRATIONS OF THE SPECIES.

BY GEORGE W. TRYON, JR.

CONSERVATOR OF THE CONCHOLOGICAL SECTION OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

VOL. IV.

NASSIDÆ, TURBINELLIDÆ, VOLUTIDÆ, MITRIDÆ.

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THE Fourth Volume of the Manual of Conchology contains monographs of four important families, embracing genera of which many representatives are included in the cabinet of every collector of marine shells. It is hoped that it will be found useful in facilitating the identification of specimens, as well as in correcting the hitherto very confused synonymy.

The kind offices of many correspondents in furnishing specimens (particularly unfigured types), drawings and information concerning the species, are again gratefully acknowledged; and I am equally indebted to others for their endeavors to promote the sale of the Manual. I shall endeavor to deserve and recompense this active interest in behalf of the work by making it as thorough as circumstances will permit.

G. W. T., JR.

January, 1882.

The Almighty Maker has throughout
Discriminated each from each, by strokes
And touches of his hand with so much art
Diversified, that two were never found
Twins at all points.

COWPER.

To ask or search I blame thee not; for Nature
Is as the book of God before thee set,
Wherein to read his wondrous works.
But what created mind can comprehend
Their number, or the wisdom infinite
That brought them forth, but hid their causes deep.

MILTON.

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MANUAL OF CONCHOLOGY.

Family NASSIDÆ.

Shell ovate, spire usually elongated, base of aperture a notch or short recurved canal, inner lip usually callous. Operculum corneous, ovate, nucleus apical, margins plain or serrated. Animal having two small processes or tails at its posterior extremity. Lingual teeth arched, pectinated; the uncini with a basal horn, and occasionally intermediate serrations: the dentition is illustrated on Plate 3.

A few fossil species are known, commencing with the Eocene.

Synopsis of Genera.

NORTHIA, Gray. Shell elongated, turrited, polished; spire elevated, acuminated, whorls depressed and sloping at their upper part; aperture shorter than the spire; outer lip with the margin serrated. Dentition unknown.

TRUNCARIA, Ads. and Reeve. Shell acuminately oblong, thick; suture of the spire channelled; aperture anteriorly dilated, posteriorly subemarginated; columella arcuated, abruptly truncated in front, with a single anterior fold. Dentition unknown.

BULLIA, Gray. Shell ovate or turrited; spire more or less acuminated, sutures enamelled; inner lip excavated in the middle, callous posteriorly; aperture oval, moderate. Operculum fusiform, nucleus apical. Dentition, Pl. 3, fig. 20.

Subgenus BUCCINANOPS, d'Orb. Shell with the whorls somewhat angulated, and with a rounded or nodulous band next the sutures.

Subgenus PSEUDOSTROMBUS, Klein. Shell elongated, smooth, without epidermis, last whorl ventricose; spire acuminate; aperture ovate, columella arched, smooth or transversely striated, outer lip thin. No enamel round the sutures. Dentition, Pl. 3, fig. 21.

Subgenus ADINUS, H. and A. Adams. Shell subulate, spirally striated; columella abruptly truncated at base; inner lip corrugated, with a callosity at hind part; outer lip grooved internally, externally marginated.

NASSA, Lam. Shell ovate, ventricose, body whorl variously sculptured; aperture ovate, with a short, reflected, truncated, anterior canal; inner lip smooth, often widely spread over with enamel, with a posterior callosity or blunt dentiform plait; outer lip dentated, internally crenulated. Margin of operculum serrated or entire. Dentition, Pl. 3, figs. 22 to 25.*

The following "subgenera" may be retained as convenient group designations, although the species, varying much in their sculpture cannot always be positively assigned.

Subgenus ARCULARIA, Link. Body whorl gibbous on the back; spire produced; callus of inner lip greatly extended and covering the spire.

Subgenus NAYTIA, H. and A. Adams. Shell smooth; aperture with a channel at the hind part continued up the spire.

Subgenus ALECTRION, Montf. Spire elevated, whorls glabrous, polished or papillary; inner lip spreading; outer lip denticulate, not variced externally,

Subgenus ZEUXIS, H. and A. Adams. Spire elevated, smooth, or longitudinally plicate, polished; inner lip with the callus defined, or somewhat spreading; outer lip externally variced, sometimes dentate anteriorly.†

Subgenus ACICULINA, H. and A. Adams. Shell turrited, polished, smooth or longitudinally plicate: inner lip with the callus sharp, straight, defined; outer lip produced in the middle, variced externally.

Subgenus PHRONTIS, H. and A. Adams. Spire elevated, acuminate, whorls ribbed or nodulose, distinctly shouldered; inner lip smooth, with an extended, thickened callus, outer lip with an external varix.

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* Messrs. H. and A. Adams in their "Genera of Recent Mollusca," have made a Genus Amycla in Columbellidæ, and included in it some species which are decidedly Nassids; the dentition of one of these erroneously placed species, N. (Bucc.) cornicula, Olivi (Pl. 3, fig. 24), has been figured by Troschel as a type of that of the genus Amycla,—which he has accordingly removed to Nassidæ.

† NASSODONTA, H. Adams. Shell oval; spire short, last whorl sulcate anteriorly; aperture sinuated in front, canaliculate behind; columella callous, plicate anteriorly; lip acute, thickened and dentate within, with an anterior marginal denticulation. Operculum and animal unknown. I have included the single species in *Zeuxis*.

Subgenus HEBRA, H. and A. Adams. Whorls spinose, muricated or sharply tubercular; inner lip with the callus defined; outer lip with a marginal varix, when adult.

Subgeuus HIMA, Leach. Spire elevated, whorls cancellated; inner lip with a rugose callus, callus defined; outer lip with a marginal varix.

Subgenus NIOTHA, H. and A. Adams. Shell cassidiform; spire short, whorls granulated or cancellated; inner lip with the callus very large and spreading; outer lip crenate, not variced externally.

Subgenus TRITIA, Risso. Spire elevated, whorls reticulated; inner lip smooth, with the callus moderate; outer lip simple, not variced.*

Subgenus ILYANASSA, Stimpson. Shell dark olive brown, reticulated, outer lip without varix, striate within, columella covered with a spreading callus. Operculum with entire (not serrated) margin. Animal having a broad foot, not bifurcated behind as in Nassa. Dentition, Pl. 3, fig. 25.

NERITULA, Plancus. Shell ovate, depressed, axis distorted; spire flattened, oblique, whorls smooth; aperture depressed; columella smooth; inner lip callous, spread over the body whorl, outer lip reflected, not denticulate or striated. Dentition, Pl. 3, fig. 26.

DESMOULEA, Gray. Shell ovate-globose, covered with a downy epidermis; spire short, conical, apex papillary; whorls depressed; aperture ovate; inner lip thickened, with a ridge posteriorly; outer lip contracted, thickened externally, plicated internally. Dentition unknown.

Fossil Genera and Subgenera.

Subgenus MOLOPOPHORUS, Gabb. (S. G. of Bullia). Short, robust, spire moderately elevated, suture bordered by a more or less distinct carina. Surface longitudinally ribbed or striate. Aperture obtuse behind, and very slightly notched; outer lip simple, inner lip very slightly incrusted, sinuous, anterior notch small, but distinctly defined.

B. STRIATA, Gabb. Pl. 3, fig. 27. Cretaceous, *California.*

Genus PTYCHOSALPINX, Gill. Shell ovate, buccinoid, whorls regularly rounded and ventricose; spire moderate (about as long as the aperture), furnished with equal revolving linear ridges, siphonal canal very short, very obliquely twisted and concurrent with the siphonal

---

* H. and A. Adams have also a subgenus *Uzita*, but its characters are not different from those of *Tritia*, whilst its species are, many of them, evidently better placed in other groups: a large number of them, for instance, possess the marginal varix, the absence of which is one of the characters of the group. *Uzita* can be advantageously dispensed with.

fasciole; aperture rhombo-ovate, oblong; labrum entire, not sinuous, smooth within; columella inversely sigmoidal, concave near the middle, with a very thin callous deposit and with a revolving linear plait in front.
Tertiary, *United States and France.*

Dr. Gill refers his genus to the family Buccinidæ, but I agree with the late Mr. Conrad that his description indicates (as do the types cited) Nassæ.

P. ALTILIS, Conrad. Pl. 3, fig. 28. Miocene, *Virginia.*
P. SCALASPIRA, Conrad. Pl. 3, fig. 29. Miocene, *Virginia.*

Subgenus PARANASSA, Conrad. Differs from *Ptychosalpinx* in the submargin of the labrum being slightly thickened within and striate; siphonal canal shorter. Eocene, Miocene, *America and Europe.*

P. GRANIFERA, Conr.* Pl. 3, fig. 30. *Virginia.*

Subgenus TRITIARIA, Conrad. Elongated, subturrited, labrum not thickened within. This does not seem to differ generically from the true Nassas; it has very little resemblance to *Ptychosalpinx.*

T. PERALTA, Conrad. Pl. 3, fig. 31. Miocene, *Virginia.*

[BULLIOPSIS, Conrad. Placed by its author at first as a subgenus of *Nassa*, it was subsequently removed by him to Melanopsidæ. It has some resemblance to *Bullia.*]

Genus NORTHIA, Gray.

The animal of this genus is unknown, but the operculum has been figured by H. and A. Adams, in their "Genera." The shell is in its general aspect much closer to *Pusionella* in the family Terebridæ than to the genera with which it is here (and has been heretofore) associated; the variceal thickening at or near the outer lip, is however, a feature which does not obtain in the Terebridæ. *Pusionella*, moreover, has a concentric operculum, with its nucleus near the middle of the inner margin. Perhaps the figured operculum of *Northia* is abnormal; it has that appearance. I think that if these shells had not been assigned to the Nassidæ or to any other family, I would have placed them in Terebridæ: as it is, I prefer to allow them to remain here, rather than possibly complicate the subject by changing their position.

---

* As one of the two specimens of the type of *Paranassa* is striate within the aperture, while the other is smooth, probably the distinction from *Ptychosalpinx* will not hold good.

N. SERRATA, Dufresne. Pl. 5, figs. 50, 51.

Livid olive, becoming chestnut-colored on the spire; a hump-like projection often occurs parallel with and just behind the margin of the outer lip. Length, 2–2·5 inches.

Panama; St. Elena, W. Col.

Gray's name *Buccinum Northiæ*, has priority, but has not been adopted. Deshayes called it *B. pristis* because Dufresne's name was preoccupied in *Buccinum* for a fossil species—an objection which has no force since the shell has been dismembered from that genus.

N. ALBOPUNCTATA, Adams and Reeve. Pl. 5, fig. 52.

Light yellowish, minutely punctate with opaque white, apex rosaceous. Length, ·8 inch.

Philippines.

N. RISSOIDES, Reeve. Pl. 5, fig. 53.

Whitish, with clouded yellow streaks. Length, ·9 inch.

Philippines.

First described as a *Pleurotoma*. The specimen figured shows a single rib or varix on the body whorl. Adams remarks that *N. albopunctata* is closely allied to this species: I think it probable that they are identical.

Genus **TRUNCARIA**, Adams and Reeve.

This genus is founded on a singular shell discovered during the voyage of the "Samarang," and is principally characterized by the abrupt truncature of its columella, and by its anteriorly dilated aperture.

T. FILOSA, Ads. and Reeve. Pl. 5, fig. 54.

Yellowish brown, maculated with two or three series of chestnut-brown spots. Length, 1·1 inches.

China Sea.

T. AUSTRALIS, Angas. Pl. 5, fig. 55.

Moderately solid, shining; the two apical whorls thin and papillose, the rest somewhat distantly and flatly longitudinally plicate on the upper portion, the plicæ crossed with fine impressed lines, the middle of the last whorl smooth, with a few impressed lines near the base; sutures grooved. Pale brown, columellar callus white. Length, 7 mill.

Port Jackson, Australia.

T. RUGATA, Reeve. Pl. 5, fig. 56.

Whitish or light brown. Length, 1·1 inches.

Habitat unknown.

The pertinence of this species to the genus is very doubtful. I have not seen a specimen of it.

T. MODESTA, Powis. Pl. 5, fig. 57.

Yellowish, longitudinally strigate or maculate or nearly covered with chestnut-brown, with a white central band.

Length, ·8–1 inch.

Panama.

Quite as closely related to *Eulhria* as to the type of this genus.

T. SULCATA, Kiener. Pl. 5, fig. 58.

Yellowish white, under a rufous epidermis. Length, 15 mill.

Habitat unknown.

T. EURYTOIDES, Carpenter.

White, with a revolving series of brown maculations on the periphery; sometimes the base is brown, or the whole surface brown spotted; with about twenty longitudinal riblets, becoming evanescent towards the aperture; aperture subquadrate, lip scarcely thickened, striate finely within, columella abruptly truncate. Length, ·3 inch.

Cape St. Lucas, Lower California.

Has not been figured hitherto, and the specimen before me (an author's type) is not in good condition for illustration. Very probably the species is not a *Truncaria*, at all; its size indicates close relationship with *Columbella*.

T. TRIFASCIATA, A. Ad. This name is given in the "Genera of Recent Mollusca," but I have not found a description of it.

Genus BULLIA, Gray.

Animal without eyes; tentacles long and slender. Foot enormously expanded, and bifid behind in the typical species. There is no operculum.

Bullia (restricted sense) has a raised band of enamel round the sutures of the whorls as in *Ancillaria*. The animal has the faculty, according to M. Quoy, of absorbing, through the pores of its foot, a great quantity of water, which it ejects when disturbed,

in various directions; it is caught by baiting lines with bits of flesh. The genus is oriental, mostly So. African in distribution, and reminds one of the Arctic genus Volutharpa (vol. iii, p. 197).

H. and A. Adams separate a genus *Pseudostrombus* on account of the want of the sutural band of enamel, and the foot of the animal being simple instead of bifid behind; but as in Nassa, the difference in the animal is not certainly to be regarded as generic; and as to the shell, there is no sharp line of division between species with and those without enamelled sutures—the globose species generally showing the most of it and the narrower ones less. Nevertheless it will be convenient to group together the narrow species as a subgenus.

In Woodward's "Manual of the Mollusca," *Bullia* is erroneously made a synonym of *Anaulax*, Roissy, a fossil form of *Ancillaria*.

Typical.

B. LÆVISSIMA, Gmel. Pl. 5, fig. 59.

Yellowish white to brownish red; smooth and polished. Length, 2·5–3 inches.

Cape of Good Hope.

B. GLOBULOSA, Kiener. Pl. 5, fig. 60.

Spire shorter, whorls slightly contracted above the middle, suture but slightly, or not at all enamelled. Length, 2·5 inches.

Habitat unknown.

I doubt whether this is more than a variety of *B. lævissima*.

B. DEFORMIS, King. Pl. 5, fig. 61.

Yellowish brown, obscurely brown banded. Length, 22–33 mill.

Mouth of the Rio de la Plata; Rio Negro, South America.

B. TENUIS, Pl. 5, fig. 62.

Thin, yellowish white, one or two revolving grooves just below the suture and a number on the lower half of the body whorl. Length, 1·75 inches.

Habitat unknown.

B. CALLOSA, Gray. Pl. 5, fig. 63.

Yellowish gray, sutural and columellar callosities generally chestnut-brown. Length, 1·25–1·5 inches.

Habitat unknown.

Remarkable for its callous deposit upon the columella, which sometimes is so thick as to give the shell a distorted appearance, producing an angle or hump on the periphery.

B. MAURITIANA, Gray. Pl. 5, figs. 64, 65.

Yellowish white, deeper yellow within the aperture; the callous sutural band frequently opaque white. Length, 1·25–1·75 inches.

Mauritius; Madagascar.

B. Mauritiana was not figured by Gray, and his description is so unsatisfactory that the recognition of the species must rest upon the illustration in Reeve's Iconica. With this, there is no doubt that *B. Grayi*, Reeve (fig. 65), is identical. The babylonic spire, strong sutural band of enamel, and distant revolving incised lines distinguish this species.

B. SEMIPLICATA, Gray. Pl. 5, fig. 66.

Whitish or yellowish, sometimes encircled by two broad, faint, brown bands. Length, 1·25–1·5 inches.

Habitat unknown.

This has very much the form of the preceding species, but the revolving incised lines are absent, and instead, the spire, and frequently the upper portion of the body whorl are longitudinally plicate.

B. DIGITALIS, Meuschen. Pl. 5, figs. 67–69, 72.

Cream-color to yellowish white, sometimes darker around the suture; orange-yellow within the aperture. Smooth, with obsolete spiral impressed lines near the base. In very large individuals the whorls are somewhat plicately wrinkled next the suture.

Length, 1·5–2·5 inches.

South Africa.

B. rhodostoma, Gray (fig. 69), is somewhat stouter than the typical form, and *B. semiusta*, Reeve (fig. 68), is a mere color variety.

Var. NATALENSIS, Krauss.

Whorls shortly plicate at the suture.

The figure (fig. 72) represents a young specimen, but this plicate condition persists, frequently, in the adults. I have one before me, measuring 2·5 inches.

B. PERSICA, E. A. Smith. Pl. 5, fig. 70.

Greyish, or lavender-color; spirally sulcate, somewhat granulous next below the suture. Length, 1 inch.

Bushire, Persian Gulf.

B. SULCATA, Reeve. Pl. 5, fig. 71.

Lavender or lead-color, rather solid; whorls closely, concentrically grooved.

Habitat unknown.

B. SEMIFLAMMEA, Reeve. Pl. 5, fig. 75.

Yellowish white, lower half of whorls with longitudinal chestnut flames. Length, 1·25 inches.

Cape of Good Hope.

Subgenus **Buccinanops**, d'Orb.

Embraces three species from the Southern parts of the Coast of South America. They are of rude growth, usually with a flattened shoulder below the sutures.

B. COCHLIDIUM, Kiener. Pl. 5, fig. 73; Pl. 6, figs. 76–81.

Yellowish white, sometimes with two obscure bands of longitudinally disposed chestnut-brown flames; whorls sometimes decidedly shouldered, and the shoulder defined by a somewhat corded ridge. Length, 1·5–3 inches.

Brazil to Patagonia; on the Pacific Coast, north to Peru.

I do not agree with Deshayes and Reeve that Kiener's species is different from that of Chemnitz, and therefore I do not adopt Deshayes' name *B. gradata:* still, as Chemnitz was not a binominal writer I cannot cite him as authority for the species. The fact is that *B. cochlidium* is of rude, frequently distorted growth, and a collection of specimens exhibits many forms. The figure of *cochlidium* given by Reeve, as exhibiting the type of the species is but slightly shouldered, and large as it is, is not adult (fig. 76); Kiener's figure is also given (fig. 73). *B. gradata*, Desh., is represented by figure 77, from Reeve's Iconica, *B. Lamarckii*, Kiener (fig. 78), is another form which is scarcely shouldered, and other intermediate forms are shown in *B. Paytense*, Val. (fig. 79), and *B. squalida*, King (fig. 80). A remarkably distorted shell, called by Gmelin *Buc. labyrinthum* (fig. 81), very probably belongs here.

B. ANNULATA, Lam. Pl. 5, fig. 74.

Yellowish white, columella white. Length, 1·5 inches.

Narrower than the preceding species, and covered with revolving striæ; yet it may be only a variety of it.

B. ARMATA, Gray. Pl. 6, figs. 82, 83.

Yellowish white, with two broad, faint, chestnut bands. Length, 1–2 inches.

Rio Negro, Patagonia.

This species is considered by d'Orbigny merely a spinose variety of *B. cochlidium.*

Subgenus **Pseudostrombus,** Klein.

Leiodomus Swainson, cannot be distinguished as a subgenus, the distinctive characters gradually merging in those of *Pseudostrombus.*

B. TURRITA, Gray. Pl. 6, fig. 84.

Shell smooth, very finely plaited at the sutures; white, sometimes obscurely brown-flamed on the lower part of the body whorl. Length, 1·25–1·5 inches.

Habitat unknown.

Very like the next species, but is somewhat longer and narrower, with more convex whorls; the plications shorter, only occupying a small portion of even the spiral whorls, fainter, not decussated by revolving striæ.

B. MELANOIDES, Desh. Pl. 6, figs. 85, 86.

Upper whorls crossed by well-marked plications, body whorl sometimes only plicate on the upper part; revolving striæ decussate the plications of the spire. Color, yellowish white, sometimes with a chocolate-colored narrow band near the sutures and a broader one at the base, or whole surface clouded or covered with chocolate. Length, 1–1·25 inches.

Cochin China; Mozambique.

B. Mozambicensis, E. A. Smith (fig. 86), is described from a well-grown specimen of the dark-colored variety.

B. GRANULOSA, Lam. Pl. 6, fig. 91.

Chestnut or chocolate, sometimes obscurely banded on the periphery, with a double row of bead-like nodules revolving below the suture. Length, 1 inch.

Gabon Coast, W. Africa.

Kiener, who figures this species as *Bucc. vittatum*, Linn., confounds with it *B. melanoides*, a shell from the opposite coast of Africa, and quite distinct, judging from the specimens before me. Lamarck considered it a *Terebra*, a genus to which this shell is closely assimilated by its usually very narrow form, polished surface and sculpture.

B. POLITA, Lam. Pl. 6, figs. 88, 89.

Cream-color, yellowish brown or livid olive, with frequently a very indistinct darker band near the suture; whorls of the apex plicate, rest smooth and polished. Length, 1–1·25 inches.

Senegal.

B. vitrea, Reeve (fig. 89), is synonymous.

B. KURRACHENSIS, Angas. Pl. 6, fig. 90.

White, tinged with rose-color on the upper whorls.

Length, 1·75 inches.

Kurrachi, Scinde, N. W. India.

Only the type specimen known.

B. VITTATA, Linn. Pl. 6, figs. 87, 92.

Yellowish or lilac-white, or bluish or brown; sometimes the spire is clouded bluish whilst the rest of the shell is light colored. Sutural plications defined by an incised revolving line and sometimes cut in two by another line. Length, 1·5–1·75 inches.

Ceylon; Zanzibar.

B. livida, Reeve (fig. 92), is only one of the many slight variations which can be readily traced to the typical form. This species occasionally develops a varix on the outer lip, and specimens are before me in which a former varix is persistent.

B. TAHEITENSIS, Gmelin. Pl. 6, fig. 93.

Spirally ridged, ridges finely granose, two or three ridges next the suture more distant than the rest; yellowish, maculate with orange-brown, interior of aperture brown stained.

Length, 1·75 inches.

Taheiti.

A very rare species, and the only one having its pattern of sculpture. The figure in Chemnitz is evidently poorly drawn, and there can be no doubt that the British Museum specimen, figured by Reeve, is a better representation of the species, as it more nearly approaches a specimen now before me.

B. Belangeri, Kiener. Pl. 6, figs. 94, 95.

Whorls smooth, polished, with distant revolving grooves which are most apparent at the suture, and base of the body whorl; yellowish, with waved longitudinal faint chestnut lines.

Length, ·9–1·4 inches.

Aracan, Ceylon.

B. polita, Desh. (fig. 95), is this species, figured from a faded specimen.

B. diluta, Krauss. Pl. 6, figs. 96, 97.

Whorls with revolving striæ; whitish, lower part of body whorl longitudinally flamed with chestnut-brown; columella truncate at base. Length, 1 inch.

Natal, So. Africa.

Painted like *B. semiflammea*, Reeve, but immediately distinguished from that species by its narrow *Terebra*-like form and truncate columella. This last character suggests the succeeding species which, however, is peculiar in having a thickened lip, minutely dentate within. It is possible that they are identical, and that *B. diluta* has a thin, unarmed lip because the specimens are not adult. Von Martens has described a var. *mediolævis* (fig. 97), in which the revolving grooves do not occur on the middle of the body whorl—a character of no importance.

Subgenus **Adinus**, H. and A. Adams.

B. truncata, Reeve. Pl. 6, fig. 98.

Yellowish white; whorls striated above and at base.

Length, 1·25–1·5 inches.

Habitat unknown.

The characters of this species are those of the subgenus. It is probably So. African. See remarks under preceding species.

Unidentified and Doubtful Species.

B. elongatula, Anton. *Habitat unknown.*

B. icterica, Solander. H. and A. Adams' Genera.

B. osseum, Menke. The type specimen is lost.

B. velata, Gould This is undoubtedly a *Nassa gaudiosa*.

B. Tamsiana, Dunker. *Guinea, W. Africa.*

B. Cumingiana, Dunker *Habitat unknown.*

B. elegans, Dunker. *Habitat unknown.*

B. Lymneana, A. Ad. = *Volutharpa*.

Genus NASSA, Lam.

H. and A. Adams in their "Genera of Recent Mollusca" have enumerated 210 species of Nassa; Reeve's Monograph in the "Conchologia Iconica" contains 182 accepted species and 13 synonyms, = 195 names in all. The present monograph includes 595 specific names, of which 131 only are accepted as good species, 364 are relegated to the synonymy of these, and 100 are undetermined for want of illustrations or specimens. The distribution of the genus is world-wide, except that no specimens exist in the icy seas near the poles—where they appear to be replaced by the Buccinums. They occur principally in the waters of tropical and subtropical latitudes.

The fossil species are few in number, commencing with the Eocene formation. For some of the American fossils Mr. T. A. Conrad has proposed distinct generic names, but their separation from Nassa is scarcely advisable.

The animal of Nassa has a broad head, and a foot quadrately expanded in front, with the corners often pointed, whilst behind it bifurcates and is prolonged frequently into two subulate tails. The operculum is usually serrate on the margin but is sometimes plain. The Nassæ are very active, and not at all shy when kept in confinement. They may be occasionally seen floating with the foot upwards. They are predaceous, feeding on other mollusks, the shells of which they bore. I have frequently seen the shells of the American species themselves bored, the hole being of such a size as to suggest cannibalism. Perhaps the avenger of their misdeeds is a beautiful and very active hermit crab which disports itself in the Nassa's shell, immense multitudes being seen at low tide in the water near the shore line. Whether begged, borrowed, stolen, or lawfully captured by the red right claw, it is certain that, at Atlantic City, New Jersey, the hermit inhabits a vast majority of the specimens of Nassa occurring to the collector. Although most of the species are littoral, a few have been collected at considerable depths; the undescribed *N. brychia*, Watson, was dredged at 620 fathoms by the "Challenger Expedition." Some of them have been observed to spring up and throw themselves over on being suddenly disturbed. Usually they glide along the surface of the mud, leaving a track indicating their line of march, at the end of which is a small

round pellet; under this the creature conceals itself. The fry twist and twirl about by means of their ciliated lobes. *N. mutabilis* is an article of food in Italy. The generic name is that of a narrow-necked wicker basket used for catching fish, and in such a basket, lobster pots, etc., the *Nassa* itself is frequently caught, attracted thither by odors savory.

Nassa reticulata is said to be very destructive in the oyster parcs of Arcachon (S. of France). It is so numerous that a single tide has yielded 14,600 specimens within a space of 40 French hectares (= about 100 acres). The adult *Nassa* will bore through the shell of an oyster three years old, within eight hours; but the young shells are far more destructive because they select the tender shells of the very young oysters, sometimes piercing fifteen or twenty in succession before their hunger is satisfied. An oyster a month old is destroyed in a half hour.*

One of the best students of the genus *Nassa* is undoubtedly Mr. F. P. Marrat, of the Liverpool Museum.† Imbued with extreme development views he has, unfortunately, adopted the principle in his scientific work that, the variations of species being illimitable—species in fact, as usually defined, being non-existant, the naturalist may apply a specific name for each modification of form, sculpture or coloration; a principle the absurdity of which must be apparent when it is considered that, no two shells being exactly alike, it will admit of the description of every individual specimen as a "new form." Mr. Marrat has, however, fully demonstrated the insufficiency of distinctions based on sculpture in a number of species of the genus; a result most confusing to the systematist, and which leaves the validity of many forms described from single or few specimens very questionable. I am tempted to make some extracts from Mr. Marrat's latest paper,‡ the subject of variation being sufficiently important in a general sense to justify me in devoting a few lines to its illustration in this particular genus.

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* Soubeiran, Bull. Soc. d'Acclimatation, 2 Ser., iii, 3, 1866.

† "On the variation of sculpture exhibited in the shells of the genus *Nassa*." "On forty proposed new forms in the genus *Nassa*," etc.

‡ "On the Varieties of the Shells belonging to the genus *Nassa*."

"The study of varieties in the genus *Nassa*," says Mr. Marrat, "has achieved one great object—it has taught us the whole details of the plan on which the external ornamentation of shells has been elaborated. The whole of the variation, from the smooth shell to the most elaborately-sculptured examples, is plainly to be seen as effected through almost imperceptible gradations.

"Variation through the whole kingdom of Nature is the rule and not the exception. It is the prejudice exhibited by Scientists against so much that is clear and distinct, that creates the confusion. If studied as it exists, the whole group is manifestly developed, step by step, and we see the wisdom, power and beneficence of the Maker.

"The greater part of the works on Natural History are written in the closets of the authors, who both theorise and copy to a large extent; but, unfortunately, they copy errors as well as facts.

"The study of variation has opened up a subject so vast in its dimensions that the mind almost shrinks from the task of estimating it. In every direction variation extends, in every way variation seems to ramify, until we gaze and wonder if there be any end.

"Instead of 200 species, at least 3000 varieties are before me, and the end appears nearly as far off as ever. Taking a careful survey of the shells under consideration, and noting more particularly the common forms and the changes presented by them, we are enabled to form an estimate of the enormous number likely to be met with, if we persevere in our work of collecting varieties.

"Species are and have been made by men in their ignorance. Had they known the alliances, it would have been impossible for them to have committed such mistakes as are to be found in conchological books. Species have been and still are the ultimatum of scientists. It appears to me that they have an instinctive horror of the nameless. Lamarck described the *Nassa subspinosa* from shells that were subspinous, not then knowing that there were carinated, costated, muricated, and smooth varieties of it. At least six good (?) species have emerged from the varieties of Lamarck's shell: *N. lyrata*,

Marrat, is the lyrate form; *N. tricarinata*, Lam., is the carinated form; *N. sculpta*, Marrat, is another; *N. sistroides*, Nevill, *N. trinodosa*, Smith, and *N. corticata*, A. Ad. Another variety occurs, showing a close affinity with the *N. muricata*, Quoy and Gaim., and the shell figured in Reeve's Conchologia Iconica as the *N. vibex*, Say, is a spiny form. Some of the shells from Ceylon are very closely connected with varieties of the *N. Gruneri*, Dunker, and others with smoother ribs to the *N. Jacksoniana*, Quoy and Gaim.

"We may name these shells and describe them as distinct, but they will not be so after we have finished; on the contrary, we may adopt another plan and name them varieties, but the same objection continues; the variety we have named as coming from any locality will be found to differ from the shells brought up from the same ground by the next haul of the dredge. It is a very disagreeable task to be compelled to state that the starting point of the systematist, upon which the whole fabric is built up, is wrong, and the whole of the deductions drawn from this source are erroneous; nevertheless I am compelled to utter that which I believe to be strictly and unquestionably true. I cannot expect that conchologists who are totally unacquainted with the materials upon which I have based my deductions, will coincide with my views. If they had obtained a knowledge of the whole of the figured or described species of Nassa, they could not by this plan follow the intricate passages revealed by the study of variation. It is not by an intimate knowledge of the described species that these facts are elicited, but it depends upon a knowledge of the innumerable intermediate forms which diverge from them in every direction as to how these deductions are to be drawn.

"In a long series of forms, commencing with shells representing the largest specimens in the genus, these can be traced with unerring certainty into others, forming the smallest examples known to exist; again, the broadest varieties can just as easily be connected with others that are the narrowest examples in the group; and every grade of difference throughout the long lines of progressive variation is distinctly seen. In the case of the shells having smooth forms, such as *N. glans*, Linn., the varieties may not be all smooth specimens, but they may vary into costate

and even cancellated examples. Again, instead of there being a uniform thickness observable, one set will be almost transparent, or thin and hyaline, and another thick and quite opaque. The sculpturing is in many cases confined to the upper whorls, but we find shells in which the pattern is commenced on the top, gradually spreading in successive development until it covers the whole shell; in one case it may form smooth unsculptured ribs, or in another it may diverge into any of the forms of sculpture we meet with in other groups of shells. The tip of the spire may be of the same color as the remaining portion of the shell, or it may vary into almost every shade of pink, rufous, brown, purple, or almost black.

"From these observations taken from the shells, and not intended to support or illustrate any theory, it is very easy to see that instead of a fixedness in the characters used for the determination of species, exactly the opposite appears to be the case; the specimens presenting such an amount of variation in every direction that it becomes absolutely impossible to affix any set of characters to them that will lead to their future recognition.

"The greater part of the shells figured and described as new species have for their recommendation to our notice a single specimen, and that often in bad condition. Men are so anxious to have their names appended to something new that every other consideration is overlooked by them. They cannot wait until sufficient evidence is produced either to confirm their opinions or show them that the characters they had given were incorrect, but down it goes on to paper, and there it remains."

What a commentary on this and preceding paragraphs is the printing of numerous new names and descriptions in the very pamphlet from which these brave extracts are made! These new species, alas! are not even figured, no dimensions are given, and in many cases no locality. The descriptions are prefaced by the remark—"What are the shells described in the following pages?—My answer is, I do not know. The amount of knowledge is confined to the single specimens (!) in most instances and to three or four at most in any case. At present these shells appear to me to be distinct, simply because of my ignorance of all their alliances, but that this should be the real

state of the case is exceedingly improbable if not absolutely impossible."

Mr. Marrat's dilemma is that, whilst disbelieving in species, he cannot pursue his work without naming and describing species. It would be impossible to give a full descriptive portraiture of an object every time it is referred to, in order that the writer's conception of it and that of the reader shall agree; therefore we adopt a conventional system—the binomial nomenclature to recall certain characters by the use of two names. I think, however, that it is a logical deduction from the views expressed by Mr. Marrat that his species should not possess such salient characters as those proposed by authors who believe more or less in the doctrine of the persistence of form: if the latter species do not present very strong claims for recognition, the former may be supposed to present no claims whatever,—unless we agree that each individual specimen in the genus shall receive a distinct specific name. If there be only one species in the genus *Nassa*, as opined by Mr. Marrat, science still requires names for those groups which normally present recognizable distinctive characters; without a nomenclature and a system, however arbitrary and unnatural, the publication of the results of scientific research would be impossible. The doctrine of unalterable uniformity in specific characters is overthrown, but a wise conservatism will, let us hope, cause conchologists to refrain from naming and describing every individual specimen: at least, gentlemen, do not overwhelm our ancient and tottering barriers with your logical deluge, until we, who have so carefully erected and guarded them, shall have retired from conchological pursuits. *Après nous le déluge*, if you please!

Typical Species.

N. MUTABILIS, Linn. Pl. 7, figs. 1–3.

Light brown, with somewhat undulated longitudinal darker markings, generally confluent into a darker interrupted band at the sutures. Length, 1–1·25 inches.

Mediterranean Sea, 4 to 10 fathoms; *W. Coast of Africa; Canary Isles*, Fossil in the miocene of *S. Europe*.

Upon the embryology of this species see Bobretsky, in Archiv für Mikros. Anat., xiii, 97.

N. Pfeifferi, Phil. (Pl. 11, fig. 144), has been referred to this species as a variety by Marrat and others; I do not think, however, that it can be placed in the same group at all, as all its affinities are with *Zeuxis*.

N. TENUIS, E. A. Smith. Pl. 7, figs. 4, 5.

Yellowish white, mottled with yellowish brown, darker at the suture. Length, 20 mill.

Japan; China.

This species was described by Lischke as *N. Japonica*, afterwards changed to *N. balteata*, on account of the previous use of the first name by Mr. A. Adams. *N. balteata* being preoccupied by Pease, Mr. E. A. Smith has referred the species to his *N. tenuis*, which was originally described without reference to these relationships. Mr. Smith also refers the *N. Japonica*, Adams, here, doubtfully, the type having disappeared from the Cumingian collection. I fear I must add to this confusion by doubting the identity of Mr. Smith's species with *balteata*, Lischke, although it appears to correspond well with Adams' description of *Japonica*.

N. sufflata, Gould (not figured), appears from the description to be identical.

The species is very closely allied to *N. mutabilis*, L.

N. LÆVIGATA, Marrat. Pl. 7, fig. 6.

Yellowish white, with darker strigations, which tend to mass into revolving bands in some specimens. The suture is sometimes noduled. Length, ·75 inch.

China.

The spire is more elevated, the shell more solid than the last species; the coloration and polished surface allies it to the *mutabilis* group.

N. CORONATA, Brug. Pl. 7, figs 7, 8.

White, olive or chestnut; with usually a white median zone on the dark varieties or a darker zone on the light colored specimens. Length, 1–1·2 inches.

Madagascar, Java, Philippines, etc.

N. Bronni, Phil. (fig. 8), is not distinct.

N. ARCULARIA, Linn. Pl. 7, figs. 9, 10.

Light colored with dark zone, or dark with a light zone; shoulder noduled, with usually a rib-like fold arising from each nodule. Length, 1–1·25 inches.

Philippines, Viti Isles.

N. laticostata, Marrat (not figured), is probably this species, not adult.

N. SULCIFERA, A. Ad. Pl. 7, fig. 11.

Ash-color, banded with white, longitudinally subplicated, transversely ridged. Length, 1·25 inches.

Algoa Bay.

Probably only a variety of *N. arcularia:* the single specimen known is abnormal in its appearance, and it is therefore not easy to assign to it a definite place in the synonymy.

N. PULLA, Linn. Pl. 7, figs. 12–14.

The plications are much closer and more numerous than in *N. arcularia;* an incised revolving line separates the shoulder extremity of these ribs, forming a row of nodules; additional incised lines cross the entire surface, but are most conspicuous on the spire, and lower portion of the body whorl. Length, 1–1·35 inches.

Red Sea, Java, Philippines.

N Rumphii, Hombr. and Jacq. (fig. 13), is synonymous. That *N. pulla* is itself identical with *N. arcularia*, is demonstrable from the series of specimens before me.

In *N. plicata*, Bolt., the longitudinal ribs are less and the revolving lines more prominent; another similar variation of sculpture has received the name *N. Deshayesii*, Homb. and Jacq. (fig. 14).

Subgenus **Arcularia**, Link.

N. GIBBOSULA, Linn. Pl. 7, figs. 15–17.

Light yellowish or ash-color, banded, flecked, or blotched with white or darker shades; edge of callus frequently defined on both sides of the back by an orange-colored line; callus whitish; within the aperture yellowish. Length, ·75 inch.

Mediterranean Sea.

N. circumcincta, A. Ad. (fig. 17), is founded on specimens showing the orange-bordered callus. It was erroneously reported from the Red Sea, but has been found at Alexandria and on the Syrian Coast.

N. KRAUSSIANA, Dunker. Pl. 7, figs. 18, 19.

Yellowish brown, indistinctly dark banded; callus yellowish or orange. Length, ·4–·5 inch.

South Africa.

N. orbiculata, A. Ad. (fig. 19), is identical.

N. THERSITES, Brug. Pl. 7, figs. 20–23.

Ash, yellowish or brown, sometimes mottled, with usually a light central band. Ribs usually obsolete on the mouth side of the dorsal hump. Length, ·6–·85 inch.

Indian Ocean, Hong Kong, Manilla, Australia.

N. bimaculosa, A. Ad. (fig. 22), represents a stumpy specimen of this species. It was described as from the Philippine Islands, and Mr. E. A. Smith reports it from Andaman Islands, "sand-banks, at low tide; very active animal." *N. dorsuosa*, A. Ad. (fig. 23), from Philippines, is evidently a monstrosity; besides, the shell looks as if it had been roasted: it is probably a synonym.

N. LEPTOSPIRA, A. Ad. Pl. 7, figs. 24–28.

Yellowish ash-color, longitudinally rather closely plicated; callus yellowish, wide spread. Length, ·75 inch.

Ilo Ilo, Isle of Panay, Philippines (on mud banks, at low water, Cuming); *Japan; Ascension Isl.* (Pease).

This may be considered on the one hand as a less-developed form of *N. Thersites*, on the other as connected with *N. foveolata*, *N. livescens*, etc., in which the sculpture and general appearance are similar, but the callus is not spreading. I unite with it *N. gracilis*, Pease (fig. 25), *N. bellula*, A. Ad. (fig. 26), *N. labida*, Reeve (fig. 27), and *N. Persica*, Martens (fig. 28). *N. Deshayesiana*, Issel, has been considered the equivalent of *N. Persica*, von Martens, by several excellent conchologists: very probably it is so, but it is tuberculate, shouldered, without spreading callus, and typically is no closer to *N. Persica* than are most of the nodulous species.

M. JONASI, Dunker. Pl. 8, figs. 29–32.

Whitish, yellowish or ash-color, usually chestnut at the suture and base, with sometimes a central chestnut band. Spire and upper portion of body whorl ribbed, sometimes cut into nodules below the suture. Length, ·4–·6 inch.

Port Jackson, Australia.

N. Burchardi, Dunker (fig. 30), is in every respect typical. *N. labecula*, A. Ad. (fig. 31), and *N. nana*, A. Ad. (fig. 32), are evidently the same species.

N. CALLOSA, A. Ad. Pl. 8, figs. 33, 34.

Very broadly gibbous when adult, with wide-spreading, thick margined callus; ribs small, distant, sometimes cancellated and nodulous; white, three banded with chestnut or suffused with with olive. Length, ·4–·5 inch.

Philippines, in sandy mud at seven fathoms; *Indian Ocean.*

This may be only a variety of the preceding species, from which it is distinguished principally by form and sculpture. *N. callospira*, A. Ad. (fig. 34 , is synonymous.

N. CANCELLATA, A. Ad. Pl. 8, fig. 35.

Light brown, maculated with darker brown. Length, ·6 inch.

Philippines.

The type is said to be rather thin and semitransparent.

N. MANGELIOIDES, Reeve. Pl. 8, fig. 36.

Solid, dark ash-color; whorls tuberculated at the upper part, tubercles here and there prolonged into ribs, interstices cancellated. Length, ·5 inch.

Port Jackson, Australia (Angas).

May be only a more solid growth of *N. cancellata.*

N. GLOBOSA, Quoy. Pl. 8, figs. 37, 38.

Longitudinally finely plicated, crossed by revolving striæ; yellowish white, tinged or nearly covered with chocolate, with frequently a white central band. Length, ·5–·65 inch.

New Ireland, Viti Isles.

N. clathrata, Kiener (fig. 38), is the same.

N. GRANIFERA, Kiener. Pl. 8, figs. 39–41.

White or yellowish, tuberculate. Length, ·6–·9 inch.

Philippines to Central Polynesia; Isle of Bourbon.

Mr. Marrat considers his *N. nodulosa* probably a deep-water form of *N. granifera:* it is not figured. *N. obliqua*, Hombr. and Jacq. (fig. 40), *N. obliqua*, Pease (unfigured), and *N. onerata*, Desh. (fig. 41) are synonyms.

Subgenus **Naytia**. H. and A. Adams.

N. GLABRATA, Sowb. Pl. 8, figs. 42, 43.

Light fawn-color, highly polished, with sometimes, traces of ribs at the sutures. Length, ·5–·6 inch.

W. Coast of Africa.

Described doubtfully as a *Strombus*. *N. obliqua*, Kiener (fig. 43), is a synonym.

N. GRANA, Lam. Pl. 8, fig. 44.

Yellowish white, brown spotted at the sutures, and with interrupted revolving brown lines. Length, ·4 inch.

Mediterranean Sea.

Subgenus **Alectrion**, Montf.

N. GLANS, Linn. Pl. 8, figs. 45–49, 52–54.

Yellowish white, clouded with yellowish brown, encircled with equidistant, narrow, chestnut-colored lines.

Length, 1·5–2 inches.

Japan, Philippines, Australia.

This is the largest species in the genus: it either varies much, however, in size and proportion, or else the following forms should be considered distinct. As they all possess the revolving dark-colored lines, I prefer to consider them as simple dwarf varieties.

Var. LATA, Tryon. Fig. 46.

Broadly ovate, approaching *N. mutabilis*, L. in form.

Length, 22 mill.

Three specimens, without locality, in the Museum of the Philadelphia Academy.

Var. ELEGANS, Kiener. Figs. 47–49.

Whorls inconspicuously shouldered beneath the sutures. Besides the revolving brown lines the surface is clouded or striped longitudinally, and revolving series of quadrangular spots frequently occur upon the shoulder and middle of the whorl. Length, 22–27 mill.

So. Australia.

A smaller, more gracefully formed shell than the type, and typically sufficiently distinct, but varies much. Kiener's figure is a poor one (fig. 47), and that which Reeve has given, as well as his description, refers to a *N. tænia*, Gmel. The following are synonyms: *N. rufula*, Reeve (fig. 48), and *N. spirata*, A. Ad. (fig. 49).

Var. SUTURALIS, Lam. Figs. 52–54.

Shoulder coronated by a row of tubercles.

Length, 1–1·5 inches.

Philippines, Australia, New Caledonia.

Fig. 54 represents the typical form, whilst fig. 53 shows a variety with the tubercles almost obsolete, passing into var. *elegans*. *N. intermedia*, Dunker (fig. 52) is an equivalent form, and *N. bucculenta*, Marrat, an unfigured species, may also be placed here.

N. HIRTA, Kiener. Pl. 8, figs. 50, 51, 55–59.

Light yellowish or orange-brown, with usually a pale central band. Length, 1 inch.

Philippines, Australia, Polynesia, Indian Ocean.

The undoubted synonyms of this species are *N. Vitiensis*, Hombr. et Jacq. (fig. 57), *N. Stoliczkana*, Nevill (fig. 58), *N. costata*, A. Ad. (fig. 50) and *N. crenulata*, Reeve, not Brug. (fig. 56). *N. crenulata*, Brug. is not to be identified positively, but looks more like *N. arcularia* than the present species. *N. hirta* probably runs into the next species, *N. monile*. *N. nodifera*, Powis (fig. 55), is not a satisfactorily determined form; if the figure which I copy from Reeve is correct, it appears to be a very broad, short, large specimen of *N. hirta*, connecting with *N. pulla*, Linn. The localities of *N. nodifera*, "Panama and Galapagos," are almost certainly incorrect. *N. bifaria*, Baird (fig. 59) is, I think, a stumpy variety.

N. MONILE, Kiener. Pl. 9, figs. 60–68.

Yellowish or ash color, with a rather broad darker central band, and sometimes narrower ones above and below it. Surface beautifully polished, ribs more flexuous than in *N. hirta;* a double row of nodules below the suture, caused by an impressed line on the sloping shoulder. Length, 1 inch.

Philippines, Australia, Central Polynesia.

This species is, typically, readily distinguished from *N. hirta*, but appears to approach the latter through varieties. The oldest name given to it is possibly *N. hepatica*, Mont., who figured a similar species in error as British, but it is well known as *monile*, and no useful purpose will be subserved in changing its name. *N. lachrymosa*, Reeve (fig. 62) and *N. pauperata*, Quoy = *N. bullata*, Marr. (fig. 61), are synonyms, and *N. Jacksoniana*, Quoy (figs. 63, 64) is a dwarf race, from Australia—a well-marked variety. *N. mucronata*, A. Ad. (fig. 67), is a variety in which the ribs are partially separated into granules, and *N. distorta*, A. Ad. (fig. 68), is a monstrosity, apparently of this species. *N. corticata*, A. Ad. (fig. 66), appears to = var. *Jacksoniana*, as does also *N. acuticostata*, Montr. (fig. 65), and *N. Tasmanica*, Woods (unfigured).

N. OBESA, G. and H. Nevill.

Shell thick, shining; brown indistinctly and minutely mottled with white, irregularly stained near the suture with a darker shade of brown; two rows of more or less granulose ridges immediately beneath the suture, columella with a moderately large, white callosity, slightly rugose, aperture ridged near its margin. Length, 22 mill.

Kutch.

Var. CEYLONICA, G. and H. Nevill.

More acuminate, less globose, suture more distinct; longitudinal ribs on the antepenultimate whorl more or less obsolete. Length, 19 mill.

Ceylon and Penang.

Has the coloration but not the fragility of *N. mutabilis*, differing also in being sculptured. Thickness, sculpture, and particularly the double row of granules beneath the suture indicate intimate relationship with *N. monile*.

N. SCALARIS, A. Ad. Pl. 9, figs. 69, 70.

Pale yellowish, obscurely banded with reddish brown. Length, 1·3 inches.

Isle of Corrigidor, Philippines, in coarse sand at seven fathoms.—Cuming.

Appears to partake of the characters of *N. monile* and *N. papillosa*. *N. crenulata*, Kiener, not Brug. (fig. 70), and *N. crenellifera*, A. Ad. (fig. 75), seem to be the same species.

N. SIQUIJORENSIS, A. Ad. Pl. 9, figs. 72, 73.

Yellowish white, three banded with chestnut.

Length, ·7–1 inch.

Indian Ocean, Philippines, Central Polynesia.

A narrower form than any of the preceding, and connecting undoubtedly with *N. scalaris*, A. Ad. Except the one below the coronal of tubercles around the suture, the revolving lines are only apparent towards the base of the shell. *N. cælata*, A. Ad. (fig. 73) appears to be the same.

N. PAPILLOSA, Linn. Pl. 9, figs. 74, 71.

Whitish, more or less blotched with yellowish brown, spire usually pink tipped. Length, 1·25–2·25 inches.

Philippine Islands, Central Polynesia.

N seminodosa, A. Ad. (fig. 71), may connect this form with the last, and through it, with *N. monile*.

Subgenus **Zeuxis**, H. and A. Ad.

With this group is united *Telasco*, H. and A. Adams, the characters by which those authors distinguish them being, in some cases at least, dependent upon the age of the specimens; juvenile forms belonging to *Telasco*, adult to *Zeuxis*. To be sure, none of the subgeneric groups have sufficient claims to distinctness, but in this case I am utterly unable to distinguish them. Messrs. Adams give as characters of *Telasco*, "inner lip spreading, outer lip simple, acute;" but many well-grown species have the inner lip with well-defined margin to the callus, and all of them, when adult, have a thickened or externally variced outer lip, dentate within. *Zeuxis* is said to be "covered with an epidermis," but in most of the species referred to it, there is certainly no epidermis. For *N. elegans*, Reeve, Messrs. Adams make a subgenus *Zaphon*, but as I consider that shell a synonym of *N. tænia*, Gmel., the type of *Zeuxis*, of course *Zaphon* becomes a synonym.

N. TÆNIA, Gmel. Pl. 9, figs. 76–82.

Chocolate or chestnut brown, with usually a central, narrow, light band; spire whorls ribbed, body whorl varying from smooth to plicate-ribbed. Length, 1·25–1·75 inches.

Ceylon, Singapore, Australia, Polynesia.

The habitat "West Indies," given by Reeve, is erroneous, as is also that of "Chili," in Kiener. A goodly number of species may be referred to this form with some confidence: They are *N. plicata*, Pease (preoccupied) = *N. approximata*, Pse., *N. fusca*, Hombr. et Jacq. (fig. 78), *N. mitralis*, A. Ad. (fig. 79), *N. badia*, A. Ad. (fig. 81), *N. cinnamomea*, A. Ad. (fig. 80). In *N. elegans*, Reeve, not Kiener (fig. 82), the style of painting varies considerably from the type, but I have before me a similarly painted specimen, which is undoubtedly a *N. tænia*.

N. CANALICULATA, Lam. Pl. 9, figs. 83–86.

Ash-olive, sometimes faintly two banded with chestnut; sutures channeled and frequently crenulate; upper whorls closely ribbed, ribs sometimes apparent on the back of the body whorl. Length, 1·1–1·5 inches.

Philippine Islands, Polynesia.

N. lævis (Chemn.), H. and A. Adams (fig. 86) is a synonym.

N. STOLIDA, A. Adams. Pl. 10, fig. 87.

Bluish-ash, sparingly blotched or banded with yellow and brown. Length, 1·25 inches.

Habitat unknown.

Described from a single specimen, which is evidently of abnormal growth.

N. UNICOLORATA, Kiener. Pl. 10, figs. 88, 89, 90.

Livid ash-color, sometimes stained or banded with brown; aperture chocolate-colored within. Length, 1–1·3 inches.

Moluccas, Australia, New Zealand.

A *Bullia*-like species, normally very distinct, yet undoubtedly closely connected by transition forms with *N. canaliculata* and *N. tænia*. *N. unicolor*, Hombr. and Jacq., is identical; the figure which I give (fig. 89) probably represents a similar shell to that which Gmelin called *N. trifasciata*. *N. rutilans*, Reeve (fig. 90), and probably *N. glauca*, Dunker, an unfigured species, belong here.

N. VARICIFERA, A. Adams. Pl. 10, fig. 91.

Whitish, with two brown bands; whorls crossed occasionally by a varix. Length, 1 inch.

Japan.

Has the appearance of an *Epidromus* (Tritonidæ), but wants the produced canal of that group. The production of true varices is certainly not a characteristic of the genus *Nassa*, yet the species has been collected often enough to show that it is not an abnormal condition: it is strange that Messrs. Adams did not make a new genus for it.

N. Cuvieri, Payr. Pl. 10, figs. 92–97.

Yellowish white, usually mottled with chestnut, with a darker line beneath the suture, and frequently, a chestnut central band. Length, ·4–·75 inch.

Mediterranean Sea; Atlantic Coast of Spain, Portugal; Madeira; Canary Isles.

This pretty little species is the victim of an immense synonymy, and of much uncertainty as to nomenclature. It is frequently referred to as *N. variabilis*, Phil., and as *N. Ferussaci*, Payr.; less frequently as *N. unifasciata*, Lam., *N. nitidula*, Linn., *N. costulata*, Ren., and a dozen other names. As regards the Linnean name, the specimen bearing it in the Linnean collection has been identified with this species, but the only figure cited in the description is that of a *Columbella*. The description itself will suit almost anything. *N. Maderensis*, Reeve (fig. 97), differs only in the numerous revolving, interrupted, chestnut lines, which, faintly seen in many Mediterranean specimens, here become more prominent.

N. semiplicata, A. Ad. Pl. 10, fig. 98.

Yellowish, encircled by two chocolate bands. Length, 22 mill.

Chusan.

N. teretiuscula, A. Ad., Pl. 10, fig. 99.

Yellowish or ash-olive, with a narrow red revolving line. Length, ·6 inch.

Eastern Seas.

The locality is very indefinite, and the figure, notwithstanding the red line, is very suggestive of *N. exilis*.

N. exilis, Powis. Pl. 10, figs. 100–102.

Ash-olive, with a central white band. Length, ·4–·7 inch.

Panama, Viti Isles, Solomon Is., Peru.

The synonyms are *N. Panamensis*, C. B. Ad., *N. Fontainei*, d'Orb. (fig. 102), and *N. mœsta*, Hinds (fig. 101). I give the locality Viti Islands on the authority of Mr. A. Garrett, and Solomon Is. on that of Mr. John Brazier, who personally collected it at those places.

N. Fontainei, d'Orb. (fig. 102), from the Coast of Peru, is larger than the Panama specimens of *exilis*, yet immature; of its identity there can be no doubt; form, sculpture and coloration being the same.

N. COMPLANATA, Powis. Pl. 10, figs. 105–107.

Olive or ash, with a yellow band above the periphery. Obliquely granosely ribbed, ribs and granules frequently obsolete on middle and lower portions of the body whorl. Aperture dark within, but showing the light band. Length, ·5 inch.

W. Columbia, Panama.

Proportionally wider than *N. exilis*, but with the same coloration, its form being intermediate between that species and *N. tegula*, Reeve. *N. scabriuscula*, C. B. Ad., and *N. Wilsoni*, C. B. Ad. (fig. 106), are synonyms. Possibly *N. gemma*, Phil. (fig. 107), may also belong here, as suggested by Mr. Marrat.

N. CAPENSE, Dunker. Pl. 10, figs. 108–110.

Yellowish or white, with a brown band. Length, ·65 inch.

South Africa.

N. pulchella, A. Ad. (fig. 110), is a variety.

N. CASTA, Gould. Pl. 10, fig. 103.

Whitish, with a subsutural and a central brown band. Length, ·4 inch.

Pacific Islands.

Evidently immature, and the figure rather inaccurate. It is a doubtful species, and is only inserted here because Gould remarks upon its resemblance to *N. Cuvieri*.

N. ISABELLEI, d'Orb. Pl. 10, fig. 104.

White, ribs evanescent on the body whorl. Animal white, active in its movements. Length, 5 mill.

Rocks; *San Blas, Patagonia.*

Probably not a *Nassa*.

N. FOVEOLATA, Dunker. Pl. 10, fig. 111.

Ash-colored; longitudinally finely ribbed, interstices cancellated. Length, ·7 inch.

Hab. unknown.

The figure is rather wider than the usual form of *N. leptospira*, and shows a narrow, defined columella-callus; nevertheless, I strongly suspect that this is only an immature form of that species.

N. PLANICOSTATA, A. Adams. Pl. 10, fig. 112.

Ash-colored, closely and finely flat-ribbed, ribs sometimes obsolete on the body whorl. Length, 20 mill.

Payta, Peru; under stones at low water.—Cuming.

N. SPARTA, Marratt. Pl. 10, fig. 113.

Light ash-color, fasciate with fulvous, purplish within. Length, ·5 inch.

W. Coast of So. America.

I am not acquainted with this species.

N. GAUDIOSA, Hinds. Pl. 10, figs. 114–120; Pl. 11, figs. 121–124, 126–132.

Spire usually acuminate, ribbed, sutures crenulate or smooth, body whorl generally smooth. Whitish, yellow, rufous, chocolate, with frequently distant, narrow red revolving lines and irregular broad bands; maculate or closely punctate with darker markings; sometimes unicolored. The form varies from elongated to broad ovate, frequently constricted at the upper part of each whorl. Length, ·75–1 inch.

Straits of Malacca, Philippines, Polynesia, Sandwich Islands, Guinea Coast, W. Africa.

A solid, smooth, usually gaudily painted species, varying very much in form and coloration. A large number of these variations have received specific names, but I do not find in any of them really distinctive characters. *N. sertula*, A. Ad. (fig. 116), and *N. semisulcata*, Dunker (fig. 117), have the typical coloration, and the latter possesses the distant red revolving lines, which so frequently form the groundwork of the ornamentation. In *N. zonalis*, A. Ad. (fig. 118), the three brown bands which are obscurely marked in *N. sertula*, become well colored. Another

modification of the banded form is *N. succincta*, A. Ad. (fig. 119). *N. Marratii*, E. A. Smith (fig. 120), is a small form in which the sutures are maculate; the colored revolving lines are present in the specimens before me, but in the darker colored ones are much obscured by the coloration. In *N. punctata*, A. Ad. (fig. 121), the sutural painting is retained, but the shell is so clouded with dark chocolate-color as to obscure the other markings. *N. compta*, A. Ad. (fig. 122), is similar, whilst the inkiest specimens have been called *N. velata*, Gould (figs. 123, 125), and *N. luctuosa*, A. Ad. (fig. 126). *N. lentiginosa*, A. Ad. (fig. 127), has been proposed for shells allied to *punctata*, dark in color, with sutural crenulations and red revolving lines. *N. mustelina*, Gould, and *N. ferruginea*, Marrat, both unfigured, are also probably synonyms. A light colored or nearly white variety, with the revolving brown lines and brown maculations, has been called by Gould *N. lilacina* (fig. 128), and by Dunker *N. coturnix* (fig. 129). To these may be added also *N. sesarma*, Marrat (fig. 130), from Whydah, Coast of Guinea, W. Africa; and *N. pallidula*, A. Ad. (fig. 131), a faded specimen from Malacca, and which equals *N. micans*, A. Ad. (fig. 132), a similarly faded specimen from the Philippines. *N. flava*, Marrat, habitat unknown, and *N. polita*, Marrat, from Mauritius, both unfigured, are, judging from the descriptions, at least very closely related to *N. gaudiosa*. *N. clandestina*, A. Ad., an unfigured Japanese species, may also be placed here until a figure may perhaps furnish the distinctive characters which cannot be found in the description.

N. PICTA, Dunker. Pl. 11, figs. 133–142.

Shell broadly ovate, very smooth and polished; spire short, conic, first finely, then distantly, undulately plicate; body whorl narrowly round-shouldered above, sometimes obsoletely tuberculate on the shoulder, incisely striate near the base. Color everywhere minutely flecked with brown or ash and white, with sometimes narrow brown revolving lines. Length, ·6–·8 inch.

Philippines, Mauritius, Australia, Central Polynesia, Cape Verd Is.

It is with considerable hesitation that I allow this to stand as a distinct species from the preceding, with which it has much in

common. It has many synonyms: *N. filosa*, Gray (fig. 134), *N. graphitera*, Beck (fig. 135), *N. Reeveana*, Dunker (fig. 136), *N. dispar*, A. Ad. (fig. 137), *N. lurida*, Gould (fig. 138), *N. musiva*, Gould (fig. 139), as well as probably the the following unfigured species, *N. Kieneri*, Anton, *N. obliquata*, A. Ad., *N. plicatula*, Dunker.

The three following species appear to me to be mere varieties of *N. picta*, perhaps connecting it with *N. gaudiosa:*

Var. MARMOREA, A. Ad. Fig. 140.

Whitish, marbled with yellowish brown, the maculations sometimes disposed in two or three bands. Length, 1 inch.

Philippines, sandy mud, at 25 fathoms.—Cuming.

Var. ALGIDA, Reeve. Fig. 141.

Livid olive, blotched with white, and painted longitudinally with waved brown streaks. Length, 1 inch.

Moreton Bay, Australia.

Var. BICALLOSA, E. A. Smith. Fig. 142.

Whitish, livid at the sutures. Length, 1 inch.

West Australia, Swan River, Cape Natal.

The double tubercular callus at the base of the columella is not unfrequently developed in very heavy specimens of other species, and is an individual rather than specific character.

N. CONSPERSA, Phil. Pl. 11, figs. 143, 144.

Shell very small, smooth, thick; yellowish or white, maculate with chocolate, forming on the body whorl two irregular bands. Length, ·4–·5 inch.

Canary Islands.

Does not differ essentially from *N. picta*, except by its much smaller size and heavier structure: it may well be a dwarf form of that species. *N. Pfeifferi*, Phil. (fig. 144), is synonymous. Several authors have recognized this shell as *N. glaberrima*, Gmel., but the description is indefinite, and the figures referred to are unrecognizable.

N. HALDEMANI, Dunker. Pl. 11, figs. 145, 146.

Whitish, marbled with yellowish brown or chestnut zebra-like markings, smooth and polished, initial whorls longitudinally plicate, base of body whorl with revolving impressed lines. Length, ·5 inch.

East Indies.

Besides the typical figure, I give a drawing of one of four specimens in the Museum of the Philadelphia Academy, which I identify with this species (fig. 146).

N. INSIGNIS, H. Adams. Pl. 11, fig. 147.

Smooth, yellowish brown, with three revolving bands of chestnut maculations. Length, 11 mill.

River Peiho, China.

Said to have been found in company with *Velorita*, and therefore possibly a brackish-water species. Mr. Adams has proposed for this shell the generic name *Nassodonta*, and refers it to the family Buccinidæ. The generic character is the development of a tubercle within the thickened margin of the lip, and rather above the periphery—a position in which, according to experience, such a feature ought to be regarded as abnormal. It is just possible that this shell is a Melanian.

N. CORNICULUM, Olivi. Pl. 11, figs. 148–150; pl. 12, figs. 151–153.

Upper whorls finely plicate or smooth, three last whorls smooth, impressed revolving lines on base, or sometimes entire surface of body whorl. A very thin horny epidermis covers fresh specimens. Yellowish or reddish brown, with usually, a pale central band; sometimes maculated with white and brown at the sutures, sometimes finely maculated over the entire surface, with red-brown, sometimes trifasciate, or the bands broken up into maculations. Salmon-colored within the aperture.

Length, ·5–·75 inch.

Mediterranean Sea, Atlantic Coasts of Southern Europe, and Northern Africa.

A protean species, which, together with *N. conspersa*, Messrs. Adams have referred to *Amycla* in Columbellidæ: the shell, animal and dentition, are decidedly Nassoid, however. *N. semistriata*, Brocchi (fig. 150), a fossil form, is considered distinct by some of the best European conchologists, and *N. trifasciata*, A. Ad. (unfigured), is made one of its synonyms; whilst *N. Gallandiana*, Fischer (fig. 152), is regarded as a variety of it. I am not able to separate these from *corniculum*. *N. Tinei*, Marav. (fig. 153), is also doubtfully referred to *corniculum:* it is immature, possibly distorted in growth; and perhaps badly

figured. *N. quercina*, Marrat, published without figure, locality or dimensions, is stated by Marrat to be "nearly allied to that very variable shell *N. corniculum*, Olivi, and may be only a variety of it."

N. INSCULPTA, Carpenter. Pl. 12, fig. 154.

Shell with close revolving striæ, upper whorls of spire slightly costate longitudinally; light yellowish brown, interruptedly fasciate or marked with chestnut. Length, ·75 inch.

Catalina Island, Cal. —40 fathoms.

I owe to the kindness of Mr. R. E. C. Stearns, the opportunity of illustrating this rare and hitherto unfigured species.

Subgenus **Aciculina**, H. and A. Ad.

The characters "outer lip produced in the middle, varixed externally," do not hold good for all the species: in fact, *Aciculina* differs from *Zeuxis* only in the species being longer in proportion to their width—still, it will be convenient to retain it.

N. ANTHRACINA, Garrett. Pl. 12, fig. 155.

Smooth, with fine revolving impressed lines. Black or blackish brown, with a light brown line on the upper part of the body whorl; aperture brown within. Length, 7 mill.

Viti Isles.

Only two specimens obtained, of which one (the type figured) is in the Museum of the Philadelphia Academy. Somewhat resembles a *Planaxis*, but is a true *Nassa*.

N. GLABRATA, A. Ad. Pl. 12, figs. 156, 157.

Smooth, pupiform, slightly costate at the apex, with fine revolving striæ on the body whorl. Olive brown, sometimes banded with ash-color. Length, ·5–·6 inch.

Philippines, Aracan, Solomon Islands

I have unicolored specimens before me, and specimens have been collected with from one to three bands. *N. Pupinoides*, Reeve (for *N. striata*, A. Ad., preoccupied), is a synonym (fig. 157).

N. MACULATA, A. Ad. Pl. 12, figs. 158, 159.

Polished, with sometimes slight indications of rounded ribs and revolving basal striations. Whitish, longitudinally maculated with chestnut, frequently disposed in two revolving series or interrupted bands. Length, ·5 inch.

Philippines.

N. vittata, A. Ad. (fig. 159), is a synonym.

N. SEROTINA, A. Ad. Pl. 12, fig. 160.

Yellowish brown, shining, lighter at the sutures.
Length, ·5–·7 inch.

Australia, Cape of Good Hope.

N. LABIATA, A. Ad. Pl. 12, figs. 161, 162.

Yellowish brown or ash-color, obscurely light banded in the middle. Length, ·7 inch.

Malacca.

N. Terebroides, Reeve (fig. 162), is a synonym, the flexuous sinus of the upper end of the lip figured in *N. labiata*, being nothing but an individual variation.

N. ELATA, Gould. Pl. 11, fig. 125.

Whorls eight, flattened, turrited, with a marginal line near the suture; six upper ones with distant, acute folds; penultimate and upper half of body whorl smooth; lower part of the latter with half-a-dozen regular, deeply impressed, revolving striæ.
Length, ·7 inch.

Africa.

I am not acquainted with the species.

Subgenus **Phrontis**, H. and A. Adams.

N. LUTEOSTOMA, Brod. and Sowb. Pl. 12, figs. 163–165.

Olive brown or ash-color, sometimes with a broad black or narrow white band; lip and expanded callus orange.
Length, ·9–1·2 inches.

Panama to Mazatlan.

N. luteostoma, Kiener (fig. 163), is a synonym: its locality is erroneously given "Senegal." *N. xanthostoma*, Gray (fig. 165), is also synonymous.

N. TEGULA, Reeve. Pl. 12, figs. 166, 167.

Ash-color, usually lighter below the sutures and on the nodules, with a light band just below the nodulous shoulder; aperture dark within, but showing the whitish band; lip and columella callus white. Length, ·5–·75 inch.

Galapagos; Panama (Cuming); *Mazatlan; Southern Coast of California.*

The name adopted for this species is not the earliest one, but it is too well established to be superseded without disadvantage to science, especially as *N. glauca*, C. B. Ad. (fig. 167), which has a year's priority of publication, is not positively identified. Several Pacific Islands and East Indian species have been supposed by Carpenter, Marrat, Pease and others to be identical, but though resembling *tegula* in sculpture, the painting in all these is different.

N. ANNELLIFERA, Reeve. Pl. 12, fig. 168.

Yellowish, encircled by bands of brown, thread-like lines. Length, ·7 inch.

Habitat unknown.

I know nothing about this species.

N. SANCTÆ-HELENÆ, A. Adams. Pl. 12, fig. 169.

White, interruptedly banded with red. Length, ·3 inch.

St. Helena, in sandy mud, at 20 fathoms.—Cuming.

Said to resemble *N. ambigua*, Mont.

N. OBTUSATA, A. Ad. Pl. 12, fig. 170.

Whitish, filleted with red spots or interruptedly banded. Length, ·65 inch.

I. of Ticao, Philippines (in coral sand, at 7 fathoms.—Cuming).

"Chiefly distinguished," says Reeve, "by the obtuse, widely separated character of the ribs, and the fine-ridged sculpture of the interstices." I have before me a series of specimens said to come from the Straits of Malacca, which correspond well with the figure of this species. They are heavier, larger and more quadrate in form, yet closely resembling the West Indian *N. ambigua*.

N. FISSILABRIS, A. Ad. Pl. 12, figs. 171–173, 179.

Ash-colored, faintly light banded, or whitish and interruptedly red-banded. Length, ·6–·75 inch.

Philippines.

The posterior channel of the aperture, may have been more developed than usual in the type of this species, but it is a character which pervades most of the species of this group. *N. nodicostata*, A. Ad. (fig. 172), *N. crenolirata*, A. Ad. (fig. 179), and *N. Stearnsiana* (Garrett), Marrat, are equivalent forms—the

latter being unfigured and undescribed. *N. albipunctata*, Reeve (fig. 173), said to have faint white-dotted bands, but which are not shown by the figure, can scarcely be different.

N. TIARULA, Kiener. Pl. 12, figs. 174–178.

Ribs few, rounded, prominent; whorls broadly shouldered and frequently tuberculated on the shoulder. White, with a single central, or several interrupted, narrow, brown bands.

Length, ·5–·6 inch.

Solomon's Is., Philippines, ? Madagascar, Kiener.

This is a more quadrate, solid, smaller form than the preceding. It, as well as some of its synonyms, has been referred to *N. tegula*, Reeve, by such experienced students as Pease, Carpenter, Marrat: I think, however, that the form and coloration and difference of habitat, will justify a separation. I add to Kiener's figure (fig. 174) one by Reeve, in which the ribs are obsolete (fig. 175). *N. coronula*, A. Ad. (fig. 176), *N. delicata*, A. Ad. (fig. 177), are synonyms. *N. trinodosa*, E. A. Smith (fig. 178), from Solomon's Is., is probably a variety of this species, although it has partly the features of *N. subspinosa*, Lam.

N. CINCTELLA, Gould. Pl. 13, figs. 180–182.

Shoulder rounded, ribs narrow, strongly laticed by revolving lines. White, with sometimes a narrow median brown band.

Length, ·45–·6 inch.

Philippines, Central Polynesia.

N. clathratula, A. Ad. (fig. 182), is synonymous. *N. cinctella*, A. Ad. (fig. 181), from St. Helena, is very close, if not identical.

N. NIGRA, Hombr. et Jacq. Pl. 13, figs. 183–187.

Dark chocolate-color within and without, with usually a light band. Length, ·5–·65 inch.

Philippines.

With this I unite *N. lirata*, Marrat, which I figure from an author's type (fig. 184), *N. Deshayesiana*, Issel (fig. 185), in which the ribs, especially round the upper part of the body whorl, are more or less nodulous. *N. scalarina*, Marrat (fig. 186). I am inclined to believe that *N. Novæ-Zealandiæ*, Reeve (fig. 187), is merely a variety.

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N. CRASSA, Koch. Pl. 13, figs. 188–190.

Yellowish or greyish, with usually a superior white band. Very thick, ribs rather small, broken into granules.

Length, ·6–·75 inch.

China, Viti Isles.

Fig. 188 is a copy of the type, said to come from China, but that locality is doubtful: the more usual form of the species is that of fig. 189. *N. semisulcata*, Hombr. et Jacq. (fig. 190), is a synonym. The species is remarkable for the ponderous thickness of well-grown individuals.

N. MIGA, Brug. Pl. 13, figs. 191–193.

Obliquely costate, costæ sigmoid, with close revolving striæ which are frequently obsolete on the body whorl except its lower part. Yellowish or orange-red, banded; or sometimes parti-colored on the body whorl, the lower portion being darker.

Length, ·5–·7 inch.

West Africa.

Fig. 192 represents an elongated variety, and fig. 193 is *N. obliqueplicata*, Dunker.

N. AMBIGUA, Mont. Pl. 13, figs. 194–197, 213.

Narrowly shouldered, ribs pretty close, crossed as well as the interstices by fine revolving lines. White or yellowish, generally banded, spotted or maculated with brown. Length, ·4–·55 inch.

West Indies, West Coast of Africa. – Dunker.

First described by Montagu as a British species, and occasionally found on the western shores of Europe, but its occurrence is adventitious. Its more scalariform spire, finer sculpture, color, absence of the strong nodules, and narrow, defined columella callus will serve to distinguish it from *N. vibex*, Say. The synonyms are *N. Antillarum* (fig. 194), *N. Candei*, (fig. 195) and *N. Hotessieri* (fig. 196), all of d'Orb., and all immature shells, of different ages; and *N. acuta*, Say (fig. 197), probably. *N. consensa*, Ravenal, is very poorly described from a single specimen found in a fish at Charleston, S. C. It is probably this species.

N. VIBEX, Say. Pl. 13, figs. 198–207.

Spire turrited, angulated by a nodulous series on each whorl, body with a rather broad, sloping shoulder, the border of which

is defined by nodules; ribs not close, frequently broken into nodules by the revolving striæ; columella callus rather widely spread. Usually olive, chocolate or nearly black, light banded on the periphery and flecked with revolving chestnut spots; sometimes the shell is nearly white, and then, whilst retaining the red spots, the band is also red, or absent.

Length, ·6–·8 inch.

West Indies; Atlantic Coast of the United States, northward to Chesapeake Bay; Rio Janeiro, Brazil.

Say's type was a stunted specimen, and is badly figured (fig. 198). Reeve's figure represents a very different species, a juvenile *N. subspinosa*, Lam., from the Philippines; but *N. Antillarum*, Phil. (figs. 199–201, and *N. Sturmii*, Phil. (fig. 202), will give a fair representation of the usual range of the species in size and color. *M. tessellata*, Reeve (fig. 203), *N. fida*, Reeve (fig. 204), both described without locality, and *N. cinisculus*, Reeve (fig. 205), from St. Thomas, W. I., are also synonyms. *N. Fretenses*, Perkins (fig. 206), is supposed by its author to possess distinguishing characters in its proportions, sculpture and color, but it is well within the range of variation of *N. vibex*, in all these particulars: it is found, though rarely, at New Haven, Conn., and near Salem, Mass., and may have been carried there with southern oysters. *N. paucicostata*, Marrat, an unfigured species from Nassau (Bahamas?), is also a probable synonym. *N. polygonata*, Lam. (fig. 207), is certainly very closely allied to *N. vibex*; it has been misunderstood by Reeve, who has figured for it a very different species, and Kiener has confounded with it *N. Jacksoniana*, Quoy, a var. of *N. monile*, Kiener.

Subgenus **Hebra**, H. and A. Adams.

I retain this group after modifying the original diagnosis, which only applies to immature specimens. The muricated or spinose ornamentation forms a convenient separation from *Phrontis*, and the columella callus is also more defined, but the spire is not "elevated" more than usual, nor is the outer lip without varix or denticulations, when mature.

N. SUBSPINOSA, Lam. Pl. 13, figs. 208–212.

Spiny, nodulous, the nodules generally forming three prominent revolving series on the body-whorl, but sometimes subor-

dinated to the longitudinal ribs. Ash-color to dark chocolate, mostly light banded between the spiral rows of tubercles.

Length, ·6–·7 inch.

Indian Ocean, Philippines, New Zealand, Central Polynesia.

N. vibex, Reeve, not Say (fig. 209), is an elongated, immature shell of this species: to which I refer also, *N. geniculata*, A. Ad. (fig. 210), and *N. sistroidea*, G. and H. Nevill (fig. 211). *N. scalpta*, Marrat (fig. 212), is described as passing into *N. subspinosa* on the one hand and *N. corticata* on the other.

N. MURICATA, Quoy and Gaimard. Pl. 14, figs. 214–218.

Whitish or yellowish, with narrow bands or blotches of chestnut or chocolate.

Indian Ocean, Madagascar, New Ireland, Polynesia.

Mr. Marrat considers this a variety of *N. subspinosa*, Lam., and he is probably correct—yet the less developed shoulder, more swollen periphery, more numerous, smaller and decidedly prickly tubercles, as well as lighter color, constitute characters deserving of recognition, I think. With it are to be united *N. horrida*, Dunker (fig. 216), *N. Gruneri*, Reeve (fig. 217), and *N. curta*, Gould (fig. 218).

N. GRUNERI, Dunker. Pl. 14, figs. 219–222.

White or yellowish, sometimes obscurely banded or spotted.

Length, ·65–·8 inch.

Philippines.

Distinguished by its regular, close sculpture of bead-like tubercles, forming both longitudinal and revolving series. The synonyms are *N. hispida*, A. Ad. (fig. 220), *N. Webbei*, Petit (fig. 221), said to come from West Coast of Africa (doubtful), and *N. acinosa*, Gould (fig. 222).

N. ECHINATA, A. Ad. Pl. 14, figs. 223, 224.

Yellowish white, longitudinally flecked with brown.

Length, ·7 inch.

Philippines, China, Andaman Isles.

This pupa-like species is a form rather unusual in the genus: it may be only a scalariform monstrosity of *N. muricata*. I have not seen specimens of it. Those from the Andamans are said to be proportionally shorter than the type. *N. nodulifera*, Phil. (fig. 224), is probably the same species: it is said to come from China. If identical, it will have priority.

Subgenus **Hima**, Leach.

N. STOLATA, Gmel. Pl. 14, fig. 225.

Whitish or yellowish, with a broad chocolate band on the periphery, and usually a narrower, subsutural one.

Length, ·75–1 inch.

Indian Ocean.

N. PAGODA, Reeve. Pl. 14, figs. 226–228.

Whitish or yellowish, stained or obscurely banded with brown.

Length, ·8–1·2 inches.

Galapagos Is., Panama to *Mazatlan.*

Kiener's *N. decussata* (fig. 227) is synonymous, and his locality "W. Coast of Africa," as well as that given by Reeve for *decussata* "Brisbane Water, E. Australia," are both erroneous. *N. angulifera*, A. Ad. (fig. 228), is a juvenile shell; it comes from Galapagos (at ten fathoms), on the authority of Cuming. *N. canescens*, C. B. Ad., and *N. acuta*, Carpenter (not Say), both unfigured, are evidently the same species.

N. TRITONIFORMIS, Kiener. Pl. 14, figs. 229, 230.

Yellowish, ash-color, or light brown; columella-callus and lip white. Length, 1 inch.

Philippines, on mud flats—Cuming; *Corisco Bay*—Marrat.

N. fuscata, A. Ad. (fig. 230), is probably the same species.

N. MYRISTICA, Hinds. Pl. 14, figs. 231, 232.

Light brown, the revolving ridges darker, sometimes dark-spotted below the sutures. Length, 1 inch.

Cape of Good Hope.

Notwithstanding the greater prominence of the revolving ridges, more undulating longitudinal sculpture, and more rugose columella, I doubt the distinctness of this from *M. Tritoniformis.*

Var. RUFOLINEATA, Marrat. Fig. 232.

Whitish or yellowish, stained or lineated with brown.

Length, ·9 inch.

Philippines.

It is the *N. polygonata* of Reeve (not Lamarck), and differs from the typical *N. myristica* only in being shorter and broader.

N. SCABRIUSCULA, Powis. Pl. 14, figs. 233–235.

Brownish, or usually ash-color, with a superior white band, which is occasionally visible on the spire; revolving lines sometimes chestnut-brown. Length, ·6–·75 inch.

Panama.

N. collaria, Gould (fig. 234), and *N. Stimpsoniana*, C. B. Ad. (fig. 235), appear to be equivalent forms.

N. NODATA, Hinds. Pl. 14, fig. 236.

Yellowish brown, with one or two faint chocolate bands. Length, ·8 inch.

Straits of Malacca.

N. FASCIATA, Lam. Pl. 14, figs. 237, 238.

Whitish, with a central chestnut band, tinged with chestnut at the base. Length, ·65–·9 inch.

South Australia.

The whole surface of this species is beautifully granulated.

N. FESTIVA, Powis. Pl. 14, figs. 239–242.

Longitudinal ribs coarsely latticed by strong, close, rounded, revolving riblets. Whitish, interstices of riblets chestnut or chocolate color; columella and lip white. Length, ·7–·85 inch.

Japan.

N. festiva is said to have been dredged by Cuming at Panama and St. Elena (in sandy mud at six to ten fathoms), but I am not aware that either locality has been confirmed. The next species (*N. dentifera*, Powis) is a native of those regions, but is constantly distinguished by being thinner, more swollen, and dark chocolate color within and without. The Japanese habitat is undoubted. The synonyms are *N. lirata*, Dunker (fig. 240), *N. dealbata*, A. Ad. (fig. 241), a somewhat narrower form, usually white, with a central brown band—it might perhaps be distinguished as a variety, and *N. acutidentata*, E. A. Smith (fig. 242).

N. DENTIFERA, Powis. Pl. 14, figs. 243–245.

Chocolate-brown within and without, with occasionally an obscure lighter central band. Length, ·7–·85 inch.

Panama to *Callao, Peru.*

N. unidentata, Powis (fig. 244), is an immature shell, and a still younger one is *N. Tschudii*, Troschel (fig. 245). To these

synonyms should probably be added *N. corpulenta*, C. B. Ad. (unfigured), from Panama.

N. ABYSSICOLA, A. Ad. Pl. 15, fig. 255.

Dirty white, slightly bead-margined at the sutures.

Length, ·33 inch.

Isle of Bohol, Philippines, in clayey ground, at sixty fathoms—Cuming.

I do not know this species.

N. PAUPERA, Gould. Pl. 15, figs. 246–250.

Elevated, narrow, whorls rounded, closely costate, and with fine revolving lines; aperture small, rounded. White or yellowish, sometimes fasciated with brown, or marbled, or with the lower half of the body-whorl brown. Length, ·35–·5 inch.

Japan, Australia, Central Polynesia.

Differs from the Nassæ preceding it in this group by its pupiform shape and comparatively small body-whorl and mouth. The spire is sometimes much exserted, causing very deep sutures. The variable painting, etc., has caused a very large synonymy, namely—*N. plebecula*, Gould (unfigured), *N. microstoma*, Pease (fig. 247), *N. unifasciata* and *N. turricula*, Pease MS., *N. balteata*, Pease (fig. 248), *N. dermestina*, Gould (unfigured). *N. fraterculus*, Dunker (fig. 249), is a stouter form, which may possibly be identical with the next species. *N. Samoensis*, Dunker MS., and *N. luteola*, E. A. Smith (fig. 250), from Japan, described from a single dead specimen, are very probably synonyms.

N. TRINGA, Souverbie. Pl. 15, figs. 251, 252.

Yellowish brown, sometimes mottled with chestnut, and spotted on the varix of the lip.

New Caledonia, S. Australia.

With this I unite *N. compacta*, Angas, of which I am able to give a figure from a specimen (fig. 252); it is the Australian representative of the European *N. incrassata*.

N. DENTICULATA, A. Ad. Pl. 15, fig. 254.

Yellowish, banded and blotched with chestnut.

Length, ·9 inch.

Mediterranean Sea.

A rare form, confounded by several authors with *N. clathrata*, Born (= *limata*, Auct.).

N. PERITREMIA, Tenison-Woods. Pl. 18, fig. 571.

Milky white, subpellucid, shining. Length, 7 mill.

Port Jackson, Australia.

N. CONCENTRICA, Marrat. Pl. 15, fig. 260.

Greyish, with two brown bands; beaded at the sutures, closely ribbed, impressed with revolving lines at the base.

Length, ·65 inch.

Habitat unknown.

A doubtful species founded upon a figure in Reeve's Iconica intended for *N. concinna*, Powis—which it is not.

N. RISSOIDES, Marrat. Pl. 15, fig. 253.

Shell white. Length, ·55 inch.

Habitat unknown.

Much more slender than the typical *N. paupera*, yet I doubt its distinctness. I have before me a single specimen which is just intermediate between the two forms.

N. EXIMIA, H. Adams. Pl. 15, fig. 257.

Cancellated by very close, small longitudinal and revolving lines; light yellowish brown, with three pale brown revolving bands. Length, 8 mill.

New Hebrides; Viti Islands—A. Garrett.

Still more pupiform than *N. paupera*, and smaller, with much finer sculpture. *N. pusilla*, Marrat, an unfigured species from Singapore, is probably (judging from the description) identical.

N. CONCINNA, Powis. Pl. 15, figs. 256, 258–259.

Closely cancellated, with an impressed line at the suture, dividing off a single row of granules. Length, ·65–·8 inch.

Polynesia; Australia.

In form, sculpture and coloring like the preceding species, but differing greatly in bulk. *N. crebrilineata*, Hombr. and Jacq. (fig. 258), and probably *N. pulcherrima*, Marrat (fig. 259), are synonyms.

N. INTERLIRATA, E. A. Smith. Pl. 15, fig. 261.

With spiral liræ in the interstices of the longitudinal riblets. Dark brown, blackish beneath the sutures. Length, 6·5 mill.

San Christoval, Solomon Islands.

N. NUCLEOLUS, Phil. Pl. 15, fig. 262.

Whitish, brown at suture and base, with usually a brown central band. Length, 5–6·5 mill.

Mazatlan; Acapulco –W. M. Gabb.

This is one of the few Mazatlan species unknown to Carpenter; it is a very distinct and pretty form.

N. INCRASSATA, Ström. Pl. 15, figs. 263–266.

Brownish white, usually obscurely maculate or banded with brown; whorls with or without a slight shoulder; shell broad to elongated ovate; occasionally (in some specimens) with a varix crossing the whorl; lip varix strong, usually with three brown spots. Length, ·45–·6 inch.

Iceland, and *North Europe* to *Azores, Mediterranean.*

Fossil, widely distributed in European tertiary and quaternary deposits. Owing to the great variability of this species, it has received numerous names: one of these forms, indeed, is usually separated by some of the best European conchologists, and it will be as well, perhaps, to designate it as var. *pygmæa*, although the immense series of specimens before me compels me to agree with Dr. von Martens, that it has no real claim to specific distinctness.

Var. PYGMÆA, Lam. Fig. 265.

Shell narrower and more finely sculptured; whorls rounded, not angulated above; spire proportionately longer.

N. incrassata is a very active mollusk, and now and then changes its crawling position by leisurely floating with its foot upwards. It often gets into lobster and whelk pots. The spawn cases are solitary, yellowish, and shaped like a round flask, with a small neck or opening at the top.

N. ROSACEA, Reeve. Pl. 15, fig. 267.

Deep rose-color, black edged at the base, lip white.

Length, 8·5 mill.

Habitat unknown.

May be a variety of *N. incrassata.*

N. PROMPTA, Marrat.

Ovately conical, highly polished, pale yellowish white, with two reddish-purple dotted bands, one in the centre of the body-

whorl, the other near the canal at the base, whorls rather flattened, ribbed to the base in front and not more than half-way down behind, raised into blunt nodules at the sutures, aperture semi-lunate, columella thickened but not spreading, tubercular, outer lip very thick, with a thin edge near the aperture; throat with rather strong and somewhat distant ridges, canal very short, stained on each side of the base with brown. This may be only a variety of that interminable shell, *N. incrassata*, Müll., but I have not seen any varieties that are likely to connect them.

The above is Marrat's description; no figure, dimensions or locality.

N. ALBA, Say.

Shell white. L. ·45, lat. ·3 inch.

Southern Coast of E. Florida, West Indies.

The sculpture of this species is said to be similar to that of *N. incrassata*, with which Say compares it. It has not been identified by later investigators. Unfigured.

N. TENELLA, Reeve. Pl. 15, figs. 268, 273.

Semitransparent orange, tinged with rose towards the apex, transversely grooved, longitudinally flexuously ribbed, aperture small, columella callous, lip thickly varicose, varix white.

Length, ·5 inch.

Cascaes Bay, Portugal.

Possibly a variety of *N. incrassata*, var. *pygmæa*, which it appears to connect with the next species.

N. Cochinensis, Thorpe, appears to be an unpublished species, although alluded to by Mr. Marrat; specimens under that name received from Mr. Sylvanus Hanley, are before me—they do not differ essentially from the figure of *N. tenella*, Reeve. The description of *N. argentea*, Marrat (fig. 273), from W. Africa, agrees very well with *N. tenella*.

N. DESHAYESII, Drouet. Pl. 15, fig. 269.

Violaceous, with brown revolving lines. Length, 15 mill.

Azores.

See remark under preceding species.

N. VERSICOLOR, C. B. Ad. Pl. 15, figs. 270–272, 275.

Yellowish brown, lower part of body-whorl and sutures usually chestnut-colored. Length, 13 mill.

Panama to *Mazatlan.*

The ribs are few, rather broadly rounded, color variable. *N. proxima*, and *N. striata* (fig. 271), of C. B. Ad., *N. rufocincta*, A. Ad. (fig. 272), *N. crebristriata*, Carpenter (unfigured), and *N. Lecadrei*, Folin (fig. 275), are synonyms.

N. SINUSIGERA, A. Ad. Pl. 15, figs. 274, 276–278.

Whitish, stained or filleted with red-brown; ribs slightly granulated at the sutures, lips varicose, sinuated at the lower part. Length, ·5 inch.

Philippines, Mauritius.

The lip-sinus is not, probably, distinctive. G. and H. Nevill figure a variety *cernica* (fig. 276) from Mauritius. *N. fraudulenta*, Marr. (fig. 277), from Philippines, and *N. cribraria*, Marr. (fig. 278), habitat unknown, are, judging from figures and descriptions, at least very closely related.

Subg nus **Niotha**, H. and A. Adams.

The difference between this group and *Alectrion* is very slight, yet its retention will possibly facilitate the classification of the species; it includes those shells having a reticulated or cancellated surface in consequence of the longitudinal and revolving sculpture being about equally prominent, whereas in *Alectrion* either the whorls are smooth or the longitudinal ribs are much more prominent than the revolving striæ. In both, the inner lip-callus is spread over the body-whorl, and the outer lip is without external varix.

N. ALBESCENS, Dunker. Pl. 16, figs. 279–283.

White or yellowish, sometimes with faintly marked ash-colored bands, which are chocolate-colored within the white aperture; first whorls usually dark ash-color.

Length, 15–20 mill.

Japan, Philippines, Polynesia, Australia, Mozambique, Andaman Isles.

The typical form of this species is easily recognized by its faint bands and dark apex; of this type is *N. bicolor*, Hombr. et Jacq. (fig. 280). There is a gradual variation from this to the next species, so that it is difficult to decide where the one should end and the other commence; among these varieties are *N. fenestrata*, Marr. (fig. 281), a somewhat more ovate form, the

name proposed for *N. Isabellei*, Reeve, not Orb., *N. Keenii*, Marr., which I figure from an author's specimen (fig. 282), *N. gemmulifera*, A. Ad. (fig. 283).

N. SPLENDIDULA, Dunker. Pl. 16, figs. 284–287.

White, shining, sharply granose by the crossing of the longitudinal ribs by deeply incised lines; occasionally marbled with light chestnut, or spotted with the same next the suture; suture deeply channeled. Length, ·6–·75 inch.

Philippines, Malacca, Polynesia.

Very close to *N. albescens*, and perhaps only a variety of that species; the tubercles are more sharp-set, the revolving lines more distant and regularly spaced—not occasionally approximating in pairs as in *albescens*. The synonyms are *N. semigranosa*, Dkr. (fig. 285), *N. ravida*, A. Ad. (fig. 286), and *N. densigranata*, Reeve (fig. 287).

N. nivosa, Marrat, and *N. crispata*, Marrat, are unfigured species compared by the author to this form.

N. PAUPERATA, Lam. Pl. 16, figs. 288–291.

Banded with chestnut on the periphery and at the base of the body-whorl, columella and lip-margin sometimes tinged with chestnut. Ribs becoming evanescent below the middle of the body-whorl, cut into tubercles by the revolving lines, a row of these tubercles below the suture, more prominent and separated from the rest by a sulcus. Length, ·5–·75 inch.

S. Australia, Tasmania.

N. lyrella, Beck (fig. 289), is a white or bleached specimen of this species, not in good condition, and I think that *N. multigranosa*, Dunker (fig. 290), is the juvenile, and *N. caperata*, Phil. (fig. 271), a pigmy adult of the same species.

N. SORDIDA, A. Ad. Pl. 16, fig. 292.

Yellowish, obscurely banded with light brown.
Length, ·65 inch.

Philippines.

The suture is somewhat channeled, the ribs rather sharp, the revolving impressed lines rather faint. This, as well as the following species may be only varietal forms of *N. albescens*.

N. CANDENS, Hinds. Pl. 16, figs. 293, 294.

Yellowish white, marbled or fasciate with chestnut; a row of granules below the suture, and close, prickly granulations covering the whorls, caused by the incised revolving lines.

Length, ·7–·9 inch.

Marquesas Isles.

N. CREMATA, Hinds. Pl. 16, figs. 295–300.

The whorls are usually channeled below the sutures so as to separate a single row of nodules, and the close ribs are crossed by closer revolving incised lines. The color is yellowish or whitish, banded or irregularly marbled with brown or ash color.

Length, ·75–1 inch.

Sts. of Malacca, Philippines, Polynesia.

The taller spire, beaded line beneath the suture, prominence of the longitudinal sculpture, etc., are the distinctive features of this species—which connects undoubtedly with *N. albescens* on the one hand, and with *concinna* on the other. Hinds' shell is not adult (fig. 295), and does not exhibit the usual appearance of the species so well as does *N. Quoyi*, Hombr. (fig. 296), or *N. fragum*, Hombr. (fig. 297).

Var. MARGARITIFERA, Dunker. Figs. 298–300.

The longitudinal ribs are narrower, sharp edged, the revolving sculpture coarse, obsolete in the middle of the body-whorl. Besides the brown or chocolate bands or blotches, the surface is numerously spotted on the sides of the small tubercles with chestnut-brown. *N. venusta*, Dunker (fig. 299), *N. costellifera* A. Ad. (fig. 300), are synonyms.

N. KIENERI, Desh. Pl. 16, figs. 301–303.

Longitudinal ribs prominent, upper margin of each whorl tuberculated, incised revolving lines faint except towards the base, where they cut up the ribs into tubercles; white with chocolate or chestnut superior and median bands; surface somewhat polished. Length, ·75–1 inch.

Singapore, Polynesia, Isle of Bourbon.

The more prominent, less decussated longitudinal sculpture is the chief distinction from *N. cremata*, Hinds, the incised revolving lines from *N. monile*, Kiener—which it most nearly

resembles in its coloring and polished surface. That a series could be arranged to show the gradual transition from one to the other of these species, although arranged in different groups, cannot be doubted. The synonyms are *N. marginulata*, Reeve not Lam. (fig. 301), called *N. Kieneri* by Deshayes, *N. margaritifera*, Reeve, not Dunker (fig. 302), and *N. Isabellei*, Reeve, not d'Orb. (fig. 303).

N. LIVESCENS, Phil. Pl. 16, fig. 304.

Yellowish, clouded with light chestnut. Length, ·8–·9 inch.

India, Chinese Sea, Philippines.

This species has the form of *albescens*, with the revolving sculpture of *cremata* and ribs of *concinna*.

N. PUSIO, A. Ad. Pl. 16, fig. 305.

Fulvous, variegated and spotted with brown.

Length, ·28 inch.

Luzon, Philippines, in coarse sand, at six fathoms—Cuming.

This shell is globosely oval, with fine ribs and rather inconspicuous revolving striæ.

N. MULTICOSTATA, A. Ad. Pl. 16, fig. 306.

White, variegated with pale red; revolving striæ obsolete.

Length, ·7 inch.

Philippines, coarse sand, at four fathoms—Cuming.

Proportionally longer, the ribs rather coarser, yet possibly an older example of *N. pusio*.

N. VERRUCOSA, A. Ad. Pl. 16, fig. 307.

Yellowish, clouded with reddish brown. Length, 1 inch.

Philippines.

The tubercles are larger and more decidedly warty than in the succeeding species, the sutural channel is deeper, the spire more conical: yet it possibly is only an intermediate form between *stigmaria* and *gemmulata*.

N. STIGMARIA, A. Ad. Pl. 16, figs. 308–310.

Whitish or yellowish, more or less clouded and marked with brown. Sculpture forming flat, somewhat square-shaped granules, those forming a row around the deep (but not wide) suture, somewhat larger. Length, ·75–1 inch.

Philippines, Malacca, Indian Ocean.

With this I unite *N. cremata*, Reeve, not Hinds = *N. quadrata*, Marrat (fig. 309), and *N. retecosa*, A. Ad., not J. Sowb. = *N. Adamsiana*, Marrat (fig. 310).

N. Cumingii, A. Ad. Pl. 17, fig. 311.

Ovate, rather ventricose, solid, suture flatly channeled. White, stained with faint chestnut-color. Length, 1 inch.

China.

Distinguished by the swollen character of the whorls—yet probably only an intermediate form between the last and next species.

N. gemmulata, Lam. Pl. 17, figs. 312–315.

Yellowish white, stained and spotted with chestnut; suture flatly channeled. Length, 1 inch.

Philippines, Sts. of Sunda.

N. clathrata, Lam., Encyc. Meth. (fig. 313), *N. conoidalis*, Desh. (fig. 315), and *N. variegata*, A. Ad. (fig. 314), are synonyms.

Subgenus **Tritia**, Risso.

Distinguished from *Niotha* by its narrow callus, yet some of the last species in that group form a passage into this. *Cæsia*, H. and A. Adams, has no distinctive character, and must merge into *Tritia* as a synonym. *Schizopyga*, Conrad, founded on a miocene species (*S. Californica*, Pl. 3, fig. 32), probably equivalent to *N. perpinguis*, Hinds, is also a synonym.

* *West Coast of America.*

N. fossata, Gould. Pl. 17, figs. 316-318.

Light yellowish brown, interior of aperture and columella deep orange, the sharp, raised, revolving ribs of the interior white. Length, 1–2 inches.

Coast of California.

A magnificent and peculiar species, not to be mistaken for any other, and the largest in the genus. *N. elegans*, Reeve (fig. 317), very fairly represents it, the figure and description of Gould (fig. 316) being from a form more ventricose than usual, and not adult. *N. elegans* being preoccupied by J. Sowerby for a fossil species, Adams changed the name to *N. Reevei*—which falls before Gould's prior name. To this synonymy is to be added *N. Morleti*, Crosse (fig. 318).

N. PERPINGUIS, Hinds. Pl. 17, fig. 319.

Yellowish white, obscurely marked or banded with chestnut. Length, ·75–·9 inch.

California.

Fossil specimens occur much larger, and varying considerably from the typical form; some of them approaching a small *N. fossata* in size and latitude. P. P. Carpenter considers *N. interstriata*, Conrad, a fossil equivalent—which is somewhat doubtful. *Schizopyga Californica*, Conrad, is probably identical: it is from the miocene.

N. MENDICA, Gould. Pl. 17, figs. 320–323.

Yellowish to reddish brown. Length, ·5–·7 inch.

Puget's Sound to San Diego, Cal.

N. Woodwardi, Forbes (fig. 321), and *N. Gibbesii*, Cooper, are synonyms of this species; which is the West Coast analogue of *N. trivittata*, Say.

Var. COOPERI, Forbes. Figs. 322, 323.

This is typically very distinct, with its seven or eight distant, prominent, shouldered ribs, but specimens are not rare which, commencing with the numerous ribs of *N. mendica*, suppress alternate ones and increase the prominence of those remaining on the body-whorl. There are also specimens intermediate in form and number of longitudinal ribs, and even some in which the ribs are obsolete on the body-whorl. As it is generally recognized as a distinct species, it may be convenient to retain its name as a variety.

N. GAYI, Kiener. Pl. 17, figs. 324, 325.

Yellowish brown to chestnut-color; longitudinal sculpture usually the most prominent, but sometimes obsolete; a row of bead-like granules usually, next below the sutures.

Length, 15–18 mill.

W. Coast of So. America, Chili, Peru.

N. rubricata, Gould (fig. 325), is a synonym.

N. COPPINGERI, E. A. Smith. Pl. 18, fig. 372.

Whitish, with a broad purplish-brown band at the top of the whorls, and two others on the last, the upper one around the

middle, and the other somewhat below; aperture bluish white, showing the external banding. Length, 13·5 mill.

Patagonia.

N. TÆNIOLATA, Phil. Pl. 18, fig. 373.

Yellowish brown, tipped with chocolate on the nodules. Length, 11–16 mill.

Chonos Isl. and So. Patagonia.

Is not *N. Coppingeri* the same?

* * *Japan, Philippines, Indian Ocean, W. Africa.*

N. NIVEA, A. Ad. Pl. 17, fig. 326.

White, solid. Length, 1 inch.

Philippines.

Very like *N. reticulata*, Linn., of Europe.

N. MUNIERIANA, Crosse. Pl. 17, fig. 331.

White, with a scarcely apparent pale brown revolving band. Length, 16 mill.

So. Australia.

N. SIGNATA, Dunker. Pl. 17, figs. 327, 328.

Yellowish brown, with a pale central band. Length, ·4 inch.

So. Africa.

Very like *N. incrassata*, but without the external lip-varix. *N. regularis*, Küster (fig. 328), is probably the same.

N. TURBINEA, Gould. Pl. 17, fig. 329.

Shell white. Length, ·9 inch.

Africa.

I am not acquainted with this species. The precise locality is unknown.

N. ROISSYI, Deshayes. Pl. 17, figs. 330, 332.

Whitish, rather thin; clathrate. Length, 15 mill.

East Indies.

N. dominula, Tapparone-Canefri (fig. 332), does not appear to differ.

N. PUMILIO, E. A. Smith. Pl. 17, fig. 333.

Whitish corneous. Length, 3·5 mill.

Wydah, W. Africa.

Is this really distinct from the preceding species? At any rate the shell is so decidedly immature that it ought not to have been described.

N. KOCHIANA, Dunker. Pl. 17, fig. 334.

Yellowish white, variegated with chestnut. Length, 3-4 mill.

Table Bay, So. Africa.

Another immature and doubtful species.

N. PLICATELLA, A. Ad. Pl. 17, fig. 335.

Yellowish, stained with light brown or ash. Length, 1 inch.

Walwich Bay, So. Africa.

Very closely allied to the European *N. reticulata*.

* * * *Atlantic Ocean and Mediterranean Sea.*

N. CLATHRATA, Born. Pl. 17, figs. 336-339.

Shell turreted, rather thin, suture flatly, narrowly channeled, whitish, irregularly yellow-banded in the middle; a deep sulcus at the base of the body-whorl. Length, ·9–1·25 inch.

Mediterranean Sea; Madeira; Canaries.

Seldom found living, but extensively distributed as a miocene and pliocene fossil. It is a very variable form, and Weinkauff even suspects that *N. miga*, Lamarck, will prove to be a variety —which is not unlikely. The oldest name used for the species is that which I have adopted, and it has the advantage of being binomial, whilst the later and generally adopted name, *N. limata*, Chemnitz, is only a portion of the phrase given in that work. *N. prismatica*, Brocchi (fig. 337), and *N. elegans*, Dujardin are synonyms among the fossil specimens. Mr. Marrat figures for *N. turrita*, A. Ad. (fig. 338), a shell which is certainly identical with this species. *N. scalariformis*, Val. (fig. 339), is not adult.

N. RETICULATA, Linn. Pl. 18, figs. 340-345.

Yellowish white, light chestnut or chocolate-color; sculpture varying considerably, but the longitudinal ribs are usually the most prominent, flexuous, distant, or numerous and close; occasionally the suture is beaded so as to resemble *N. monile*, Kiener. Length, ·75–1·25 inch.

Europe, from Norway to the Mediterranean.

Fossil, from the miocene throughout Europe.

Jeffreys * says: At the recess of each tide this mollusk buries itself in the sand in a slanting position, its lurking-place

* Brit. Conch., iv, 348.

being betrayed by a little hillock. It also gets into lobster-pots for the sake of the bait. Bouchard-Chantereaux attributes to this as well as to other whelks, the habit of piercing and devouring bivalves. According to M. Lespés, *N. reticulata* is preyed upon by a parasitic Trematode (*Cercaria sagittata*) which infests its liver. Its spawn cases are deposited on the leaves of *Zostera* and on various other things which are left dry only at spring tides; the capsules are arranged in rows, and so closely that they overlie each other "like the brass scales of the cheek-band of a hussar" (Johnston). They are compressed pouches, each of the size of a large spangle, supported on a very short stalk, with a small opening at the top to allow the fry to escape. Mr. Peach described and figured the capsules in the Reports of two Cornish Societies for 1843 and 1844; and he has given us some amusing particulars of the fry. These behaved themselves like the fry of other gastropods, skipping about and whirling round by means of their ciliated lobes, apparently in a state of pleasurable excitement; but it seems that the exercise was compulsory, or necessary to prevent the attacks of a swarm of infusoria, which made short work of any tired or feeble infant *Nassa*.

Mr. Jeffreys has named *N. nitida* (fig. 340) a shell which he says is as distinct from *N. reticulata* as *N. pygmæa* is from *N. incrassata*, and he states that he has not seen any intermediate forms. He states that *nitida* is found only in brackish water and on muddy bottoms. A specimen among a number dredged by him in Roach River, had two eyes on the right hand tentacle; the eyes were smaller than usual, and close together. I agree with Mörch and Von Martens that *nitida* is merely a variety of *N. reticulata*. Mr. Jeffreys cites *N. reticulata* from Japan;* the identity of the Japanese shell must be supposed to be in the sense in which Mr. Marrat would regard it—yet I can admit it also, if it be considered necessary to prove an immense distribution for the species. *N. reticulata*, figured by Quoy and Gaimard in the Voy. of the Astrolabe, is *not* this species however, but probably *N. cremata*, var. *margaritifera*. A curious, thin, swollen form from the Baltic is known as *N. cancellata*, Chemn (figs. 343-345).

* Jour. Linn. Soc., xii, 107.

N. TRIVITTATA, Say. Pl. 18, fig. 346.

White or yellowish white, sometimes faintly marked by three revolving light brown bands. Suture channeled, with usually a bead-like row of small tubercles below it, and separated from the cancellated and tuberculated surface by a slight impressed line. Length, ·7–·9 inch.

Massachusetts to *Florida*.

The animal is whitish, sparsely dotted with pale lilac; foot slightly bifid behind with two erect subulate processes. Very active. Comes out of the sand towards low-water mark, in a minute or two after the water passes over them. On most specimens the bands on the shell are either obsolete or so faintly marked as to escape hurried observation.

Subgenus Ilyanassa, Stimpson.

The generic characters proposed by Stimpson include an operculum without serrated margin, and the animal without posterior bifurcation. Although the operculum is usually crenated in *Nassa*, Mr. Marrat has enumerated a dozen species in which it has been observed to have plain margins, or nearly so; and Dr. Von Martens states* that the European *N. reticulata* is found in the mud-flats of the Venetian lagunes with the operculum plain on one side and somewhat serrated on the other, and that the end of the foot is but slightly notched in these specimens instead of being deeply bifurcated. Under these circumstances, it becomes very doubtful whether the group *Ilyanassa* ought to stand. I have concluded to retain it provisionally as a subgenus, especially as it may include several species conveniently separable from *Tritia* by having dark-colored shells.

N. OBSOLETA, Say. Pl. 18, figs. 347–349.

Chocolate-brown or olive, with occasionally a faint, lighter colored central band; deep chocolate within the aperture, with a central white band. Length, ·75–1 inch.

Massachusetts to *Florida*.

The animal is variously mottled with slate color, the tentacula are suddenly diminished above the eyes, and become bristle-like.

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* Zool. Record, ii. 244.

Its movements are very active, and it collects in numbers about dead crabs and other marine animals, on which it feeds. Inhabits all our muddy shores, preferring situations not exposed to the surf of the open sea; such as inlets and extended flats which are drained at low tide. It is found abundantly at the confluence of fresh and salt water, where the taste is merely brackish. No shell of equal size is so abundant on the whole Atlantic shore. Specimens from Florida vary only in being smaller, more olivaceous, and by having a thick, broad callus over the pillar. The younger shells are most likely to be collected, because the old ones become very much eroded and defaced, and a greenish mould-like plant vegetates abundantly upon them. Very few, therefore, of the shells usually collected, have the lines on the interior of the outer lip. Kiener's figure (fig. 348 , *N. olivæformis*, represents a young shell * The ova-capsules are laid during April and May, are of transparent corneous texture, singly attached to the inside surface of a valve of *Mactra*, or the inner face of the nidus of *Natica;* they are deposited in vast numbers, completely covering the object to which they are attached and crowded together promiscuously (fig. 349).

N. MELANIOIDES, Reeve. Pl. 18, fig. 350.

Smooth, thread-margined around the upper part, striated near the apex, last whorl grooved at the base. Thin, dark olive, interior purple-black. Length, ·85 inch.

Moreton Bay, Australia. - Strange.

Reeve remarks: This species, like *N. obsoleta*, has a characteristic fresh-water aspect like that of a *Melania*. I have not seen it.

N. NIGELLA, Reeve. Pl. 18, fig. 351.

Dark brown, without and within, lip with an exterior varix. Length, ·4 inch.

New Zealand.

N. NUCEA, Pease. Pl 18, fig. 352.

Dark chocolate; closely reticulated; lip with exterior varix. Length, 12 mill.

Caroline Isles.

* Gould, Invert. Mass., Binney's edit., 362.

More pupæform and apparently with much closer, finer sculpture than *N. nigella*, yet they may very possibly be identical. I do not hesitate to place these species in this group, although they possess an exterior lip-varix, since otherwise, the relationship is sufficiently apparent.

Undetermined Species of Nassa.

BUCCINUM FLORIDANUM, Lesson. *Acapulco.*
"Is the South Sea representative of *B. Cuvieri* of authors."

N. GEMMELLARI, Biondi. *? Mediterranean.*
Is exotic, and perhaps = *N. trivittata*, Say.

N. TRICARINATA, Lam. *Hab. unknown.*
Not recognized by Kiener, Deshayes or subsequent authors.

N. NISOTA, Potiez et Michaud. *Senegal.*

N. CANCELLARIA, Potiez et Michaud. *European Seas.*

N. SEMINULUM, Tapp. Can. *Papuan Isles.*

N. VITREA, Gray. *Sierra Leone.*

N. ATTENUATA, Gray. *Pacific Ocean.*

N. COSTULATA and N. MARMORATA, Anton. *Hab. unknown.*

N. FRIGENS, Von Martens. *W. Coast of Africa.*
Dredged at a depth exceeding 150 fathoms (precise depth not mentioned); resembles *N. trivittata*, Say, somewhat, but more fragile. Owing to the depth of water it has the appearance of the Arctic mollusca. The species of *Nassa* are decidedly littoral in habit, so that this is an extraordinary exception, and raises the question whether the species is really a *Nassa*.

N. NITIDULA and N. CANDIDISSIMA, C. B. Ad. *Jamaica.*

N. GEMMULOSA, C. B. Ad. (Very young shell.) *Panama.*

N. LIMNÆFORMIS, N. HERRMANNSENI, N. HANLEYANA, N. RUFA, N. SCULPTA, N. DARWINI, N. FORBESII, Dunker; all without locality. N. VARIANS, Dunker, *Japan.*

N. VITREA, N. ACUTIMARGO (*China*), N. AFRUM (*Aden, Madagascar*), N. BICOLOR, N. BIRMANICA (*Burmah*), N. CHINENSIS (*Loo Choo Isles*), N. CORRUSCANS (*Bali Isl.*), N. LIMICOLA (*China*), N. RINGENS, N. PINGUIS (*Bali Isl.*), N. QUISQUILIARUM (*China*), N. SINARUM (*China*), N. LÆTUM, all of Philippi.

N. BEATA (*Loo Choo Is.*), N. QUANTULA (*St. Simon's Bay*), N. REPOSTA (*Sydney, N. S. W.?*), N. PEDICULINA (*Hong Kong*), N. OPTATA (*Sydney, N. S. W.*), N. SPURCA (*St. Simon's Bay*), N. PLICATELLA (*British Burmah*), all of Gould.

Most of the above are from the collections of the North Pacific (U.S.) Exploring Expedition: they have not been figured, and the type specimens were destroyed in the great Chicago fire. Some of them might be identified with other described species, but it is better not to do so, I think, under the circumstances.

N. NODICINCTA (*Galapagos Is.*), N. CORRUGATA (*Eastern Seas*), N. AUSTRALIS (*Australia*), N. CRENICOSTATA, N. SCITULA, all of Arthur Adams.

N. FUSCOLINEATA, E. A. Smith. *Japan.*

N. (CÆSIA) SIMPLEX, E. A. Smith. *Uruguay.*

The following forty "species" are described (but not figured) by Mr. F. P. Marrat, who does not believe in species. I take them, with great pleasure, at his own valuation, for I cannot afford to expend my time over diagnoses which should never have been written by a gentleman holding such opinions as Mr. Marrat does, as to the instability of every specific character. Theoretically, Mr. Marrat relegates all the Nassæ to one specific form; practically, he describes such individuals of that form as he likes to name; and if every other collector should adopt his views and be equally industrious, we should eventually have every individual specimen of the genus bearing a distinct specific name: moreover each collector would possess the sole specimens of his own species. No locality is given with most of the descriptions.

N. NODOSA (*Malacca*), N. PICTURATA, N. ACUMINATA, N. LYRÆFORMIS (*China*), N. GRANULOSA, N. LACTEA, N. GRATA (*Canton*), N. CÆRULEA, N. TABESCENS, N. CRASSICOSTATA (*Bombay*), N. LAUTA (*Malacca*), N. QUINQUECOSTATA, N. HANLEYANA (Dunker has preoccupied the name), N. PARVA, N. SINENSIS (*China Seas*), N. OBLONGA, N. RUGOSA, N. SMITHII, N. CLARA, N. HARPULARIA, N. ABYSSINICA (*Abyssinia*), N. ROTUNDICOSTATA, N. BELLA, N. ACUTANGULA, N. UNDATA, N. PRÆCALLOSA, N. MULTILINEATA (*South America*), N. VINCTA, N. PURA (*W. Indies*), N. MINOR (*Kabenda*,

W. Africa), N. ELONGATA = N. ORIENS (*China Seas*), N. LUCIDA (*Keeling's Isl.*), N. ÆTHIOPICA (*Kabenda, W. Africa*), N. CINGENDA.

The following species are mentioned by name only in Marrat's "Varieties of Nassa," and I presume that they have not been described.

N. NIVIFER, N. INTERSTINCTA, N. CORRUGATA, N. RECEDIVA (*Cape de Verds*).

In the "Varieties" I find the following specific names attributed to other authors, but which do not appear to have been described: N. LINEOLATA, Phil.; N. PUSIOLA, Dunker (*Viti Isles*); N. SPRELA, Watson (*Amboina*); N. AGAPETA, Watson (*Lavuka*); N. ANGULATA, Thorpe (*China*); N. BRYCHIA, Watson (*Gomera*, 620 fathoms); N. SPILUS, Watson (*Rain Isl., Torres Sts.*); N. BABYLONICA, Watson; N. BIBALTEATA, Pease (*balteata*, Pse?); N. EMERSA, Carp. (*immersa*, Carp.?); N. GALILEA, Clark; N. CONFERTA, Martens.

Genus **NERITULA**, Planens.

In *Neritula* the last whorl is depressed and extends over the penultimate whorl, nearly covering and concealing the spire, which consequently appears very obtuse. The animal has a bifid tail, and operculum similar to *Nassa*. Risso's name *Cyclope* has been almost equally used for this group. H. and A. Adams' genus *Teinostoma* was originally placed next to *Neritula*, in their "Genera;" subsequently they removed it to the Rotellinæ or Umboniinæ.

N. NERITEA, Linn. Pl. 18, figs. 353–356, 359.

Shell smooth and polished; fulvous minutely speckled with chestnut-brown, with usually darker and larger markings, forming a sutural band and another upon the periphery; the callous, flattened columella, yellowish stained with brown, is spread out in circular form covering the inferior surface to the periphery.

Diam., ·5 inch.

Mediterranean Sea.

The shell has very much the appearance of a *Rotella*, being transversely flattened into a disk-like form. *N. Italica*, Issel, is a synonym; I figure two examples of it to show the young and half-grown states of the species (figs. 355, 356).

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N. PELLUCIDA, Risso. Pl. 18, fig. 360.

Hyaline, with opaque white spots and callus; frequently brown-spotted around the suture, and sometimes on the periphery.

Diam., ·25–·35 inch.

Mediterranean Sea.

Weinkauff considers this var. *minor* of *N. neritea*, but the coloration is decidedly different as well as the size being smaller.

N. KAMIESCHI, Chemn. Pl. 18, figs. 357, 358.

Brown, with a white sutural and peripheral band, callosity rosy-brown. Last whorl enveloping a portion of the spire, which only shows three minute whorls, and has a sharp point.

Black Sea.

Genus **DESMOULEA**, Gray.

Desmoulea is remarkable for its obtuse apex and solid growth, much resembling some species of Cassididæ; when in fine condition, the shell is clothed with a velvety epidermis, but most cabinet specimens are denuded of this. The animal is unfortunately unknown, and therefore the systematic position of the genus remains somewhat uncertain—for, whilst some species connect closely with *Nassa*, the revolving sculpture, globose form, sunken suture and mouth of others are suggestive of *Semicassis*.

D. ABBREVIATA, Gmelin. Pl. 18, fig. 361.

Yellowish white, with chestnut-colored spots and strigations.

Length, 1–1·5 inches.

Cape of Good Hope.

Differs from all the other species in its distant incised revolving lines.

D. PINGUIS, A. Adams. Pl. 18, figs. 362–364.

Yellowish and white, variegated, with alternate white and yellowish brown irregular spots around the suture; revolving sculpture close and fine raised lines. Length, 1 inch.

Senegal, Japan.

The latter locality is assigned for *D. crassa*, A. Ad. (fig. 364), which Reeve changed to *Nassa ponderosa*, the former name being preoccupied in *Nassa*. *D. pulchra*, Gray, the type of his genus is

very probably this species, but has never been figured, and remains unidentified.

D. RETUSA, Lam. Pl. 18, figs. 365–367.

Marbled with chestnut and white, or blush-pink, sometimes obscurely banded with spots around the suture and on the periphery. Length, 1 inch.

Liberia.

D. Tryoni, Crosse (fig. 367), is described from a remarkably thickened specimen, with a copious callous deposit on the columella, but it does not afford any varietal characters.

D. JAPONICA, A. Adams. Pl. 18, fig. 368.

Light fulvous, ornamented with brown longitudinal flames and spots variegated with white, especially around the suture.

Length, 1 inch.

Japan.

The pertinence of this species, as well as of those which follow, to the group, is somewhat doubtful, as they have the form of *Nassa*, including its pyramidal spire.

D. PYRAMIDALIS, A. Adams. Pl. 18, fig. 369.

Yellowish brown, apex violet-tinged. Length, ·85 inch.

Port Elizabeth, So. Africa—Marrat.

D. RINGENS, A. Adams. Pl. 18, fig. 370.

Brownish orange. Length, ·7 inch.

Habitat unknown.

A singular species which unites the sculpture of *Nassa* with the mouth of *Desmoulea*—the latter even exaggerated in its characters.

Family TURBINELLIDÆ.

This group includes a few ponderous tropical species, allied in the characters of the mouth, and in general form and ornamentation to the Peristerniinæ (see vol. iii, p. 79), on the one hand, whilst in size they approach the Volutidæ. The plications on the middle of the pillar are rather distant, narrow, high, and transverse, whilst in Fasciolariinæ they are situated lower, are not so prominent, and oblique in direction. The epidermis is frequently persistent.

The animal (of *Vasum*) is slow-moving, timid and inactive, shrinking quickly within the shell on the slightest alarm. The operculum is ovate, acute, with an apical nucleus; it is very thick, claw-like, and partially free at the hind part. The dentition resembles somewhat that of the Buccinidæ, differing in the lateral teeth; it differs widely from the Nassidæ, and quite as much from that of the Fasciolariinæ or Peristerniinæ.

Synopsis of Genera.

Genus TURBINELLA. Lam. Thick, obconic, smooth, last whorl large; spire obtuse, apex papillary; aperture oblong, narrow; canal long and straight; columella with several strong, transverse plaits in the middle; outer lip thin, simple. Animal unknown.

Subgenus CARICELLA, Conrad. Columella-folds decreasing in size from above, as in *Mitra*, base canaliculate and not emarginate. The above characterization is somewhat vague, but the small group of fossils referred to it may be said to resemble *Turbinella* in essential characters, the difference being that the folds are situated lower down on the pillar, and that the shell is thinner.*

C. PRÆTENUIS, Conrad. Pl. 3, fig. 35. Eocene, *Claiborne, Alabama.*

Genus VASUM, Bolten. Shell oval, oblong, solid, tubercular or spinose, with spinose fascioles below; spire short, apex not papillary; aperture oblong; canal short, somewhat recurved; columella with several transverse folds in the middle; outer lip thickened and sinuous. Dentition, Pl. 2, fig. 1.

Genus **TURBINELLA**, Lam.

I adopt Lamarck's generic name in preference to that of *Mazza*, Klein, because the latter included several groups, and was only limited to its present signification by Messrs. H. and A. Adams, whilst the former author cites as his sole type a species which possesses the distinctive characters now assigned to the genus. The difference between the shells of *Turbinella* and *Vasum* is not such as to indicate any differential characters in the animals (unfortunately that of *Turbinella* is unknown) and the separation of these genera is merely a matter of convenience

* Conrad has formed a genus *Mazzalina* (uncharacterized), for a Claiborne fossil, which seems to have suggested to him the recent genus *Mazza* (= *Turbinella*). The type is, I believe, more nearly related to *Lagena* from which it does not appear to have any differential characters (see vol. iii, p. 225).

to the systematist. The dentition of *Imbricaria*, Schum., a group of Mitridæ, differs radically from the type of that family and approaches closely to *Turbinella*—that is, if Troschel has correctly identified the mollusk examined by him; but the species are so essentially Mitræ in other characters that to separate them from that family would be very inexpedient.

T. PYRUM, Linn. Pl. 19, figs. 1–3, 5–7.

Whitish or yellowish white, under a thick, light olive epidermis; sometimes irregularly sprinkled with chestnut-colored spots; interior of aperture and columella yellowish to orange-brown.

Length, 4–7 inches.

Ceylon.

T. rapa, Gmel. (fig. 5), = *gravis*, Dillw., = *clavata*, Wagn., = *napus*, Lam. (fig. 3), is distinguished by most authors on account of its more swollen growth and absence of spots, but the distinction does not hold good, the shell becoming more swollen and less spotted with increase in size; like our Virginia Deer the spotted coat is a juvenile condition of which, however, traces sometimes remain, or rather recur, in the adult shell. I figure a very curious planorboid monstrosity (figs. 6, 7), existing in the Museum of the University of Ghent.

The shankh or chank is the sacred shell of the Hindus, and the national emblem of the Kingdom of Travancore. The god Vishnu is represented as carrying a chank shell in one hand and a chakra in the other.

The Hindus believe that unless they worshiped this shell at the commencement of every worship or prayer, their offerings would not be accepted. The first incarnation of Vishnu, called Machhávatár (which literally means transformation into a fish), was undertaken for destroying Shankhásura (the giant chank shell), in order to regain the Vedas, he having stolen them and taken refuge under the ocean.

The fishery for these shells is principally carried on in the Gulf of Manaar, in the vicinity of Ceylon, and on the coast of Coromandel, at Travancore, Tuticorin, and other places, the shells being brought up by divers in about two or three fathoms of water. Those taken with the animal in, and called green chanks,

from having the epidermis on, are most in demand. The white chanks, or dead shells thrown upon the beach by strong tides, having lost their enamel, are scarcely worth the cost of freight to Calcutta. The number obtained varies considerably in different years, according to the weather and the success attending the divers. Frequently four or five millions of these shells are shipped in a year from the Gulf of Manaar. In some years the value of the rough shells, as imported into Madras and Calcutta, reaches ten to fifteen thousand pounds sterling. A few hundreds are occasionally imported into Calcutta from the Arabian and Persian Gulfs. The chank fishery of Ceylon at one time employed six hundred divers, and yielded a revenue to the island government of £4000 per annum for licenses. The fishery is now free.

These shells are often used as oil vessels or lamps in Indian temples, for which purpose they are carved and sculptured or otherwise ornamented. A reversed chank is so highly prized for its rarity as sometimes to sell in Calcutta for its weight in gold, or at from forty to fifty pounds sterling. In Ceylon, also, the reversed variety is held sacred by the priests, who administer medicine by it. This shell, from its weight and smoothness, is used in Dacca for calendering or glazing cotton, and in Nepal for giving a polished surface to paper.

The principal demand for these shells is for making bangles or armlets and anklets, and the manufacture is still almost confined to Dacca. The shell is cut or sliced into segments of circles, or narrow rings of various sizes, by a rude semicircular saw, the hands and toes being both actively employed in the operation (Pl. 3, fig. 34). Some of these bangles, worn by the Hindoo women, are beautifully painted, gilded and ornamented with gems.

The shell rings are coated inside with plaster to smooth the roughness. Filagree-bordered edges of plaster are also added; patterns and devices of red, blue and gold are figured on them, and they are further ornamented with silver or gold tinsel, spangles, small colored glass beads, etc. The larger bracelets, formed of many segments, are made to open to admit the hand, by two spiral pins, which unscrew and let out the piece (Pl. 3, fig. 33). These bangles are not removed at death, and hence

there is a continual demand for them, many wearing several, both on the legs and arms.*

In India, China and Siam the chank shell is highly prized, especially a sinistral variety found on the coasts of Tranquebar and Ceylon, and made use of by the Cingalese in some of their most sacred rites. Such reversed shells are held in special veneration in China, where great prices are given for them. They are kept in the pagodas by the priests, and are not only employed by them on certain special occasions as the sacred vessels from which they administer medicine to the sick; but it is in one of these sinistrorsal turbinellas that the consecrated oil is kept with which the emperor is anointed at his coronation. These shells are often curiously ornamented with elaborate carvings. The turbinella is so extensively employed in ornamental manufactures in the East Indies that upwards of four million shells have been exported in a single year from Ceylon to the ports of Calcutta and Madras; these are chiefly employed in making armlets and anklets, which are often highly ornamented and are known by the name of bangles. The mamillary apex of the shell is made into a button or bead; the latter are called krantahs, and necklaces of these are so commonly worn by the Sepoys in the East India service as almost to be deemed a regular part of their uniform.†

T. OVOIDEA, Keiner. Pl. 19, fig. 4

Whorls smooth or obsoletely striated; pinkish white, under a thin, smooth, horny epidermis. Length, 4–6 inches.

Bahia, Coast of Brazil.

Occurs numerously in the miocene of Santo Domingo, West Indies.

T. SCOLYMUS, Gmelin. Pl. 20, fig. 8.

Yellowish white, under a thin, fibrous, olive epidermis; columella and interior flesh-pink. Length, 8–10 inches.

Bahia, Brazil; West Indies?

The largest species in the genus and one of the largest of univalve mollusca. Fine specimens occur in the miocene of Santo

* Simmonds' Commercial Products of the Sea, 288.

† Wilson, Canad. Nat., iii, 400, 1858.

Domingo, and the West Indies is given as habitat in the "Conchylien Cabinet," but the species does not occur in the Swift Collection, and I think there is no other authority for this locality. The young shell is so covered with nodules and revolving ribs as to be readily mistaken for another species. The revolving sculpture disappears and the nodules become fewer and more prominent with advancing age. This and the next species do not fall completely within the generic characters of *Turbinella;* the sculpture and nodules indicate a transition to *Vasum*, but they have not the elaborate ornamentation of the latter genus—particularly its spinose fasciole.

T. FUSUS, Sowb. Pl. 20, fig. 9.

White, covered with a thick, fibrous epidermis tufted in rows. Length, 7 inches.

Habitat unknown.

The tufting occurs upon the distant revolving riblets. It is possible that this is a specimen of *T. scolymus*, in which the development of the tubercles has been partially arrested.

Genus **VASUM**, Bolten.

V. MURIATICUM, Born. Pl. 20, figs. 10, 11; Pl. 21, fig. 19.

White, covered with a rather thick, fibrous brown epidermis; columella tinged with rose-color. Length, 3·5–5·5 inches.

West Indies; Panama; Mazatlan.

Reeve attempts to distinguish *V. cæstus*, Brod. (fig. 12), from the Bay of Caraccas, by its having broader furrows, larger tubercles and only four instead of five plaits on the columella, but these characters vary considerably in the numerous specimens before me. The fifth plait is merely an incipient one which sometimes occurs between the normal upper plait and the next one below it. The West Coast specimens which I have examined are all four-plaited, and this corresponds with Carpenter's remark upon them in his "Mazatlan Catalogue." I think that *T. Crosseana*, Souv. (fig. 19), described from a single specimen, the locality of which was doubtful, is probably only a worn individual of this species.

V. RHINOCEROS, Gmelin. Pl. 21, figs. 13, 14.

Variegated, whitish and chestnut-brown; columella and

interior of shell brown or pink; columellar plaits three in number. Length, 2·5–3 inches.

Zanzibar; Carthagena, N. G.; Bahia, Brazil.

V. Cassidiforme, Val. (fig. 14), is merely a more perfect growth of this species, the revolving sculpture being squamous. The expansion of the posterior part of the aperture, that of the columellar callus, the more distant nodes on the shoulder of the body-whorl serve to distinguish this from the preceding species.

V. CERAMICUM, Linn. Pl. 20, fig. 10; Pl. 21, figs. 15, 18.

Yellowish white and black, variegated, stained and irregularly banded; outer lip usually black-bordered within.

Length, 3·5–6 inches.

Philippines, Polynesia.

V. armatum, Brod. (fig. 10), is the juvenile of this species, and *V. vexillulum*, Reeve (fig. 15), is a still younger state.

V. IMPERIALE, Reeve. Pl. 21, fig. 23.

Whitish, scorched with brown, tubercles blackish; interior white, columella stained with rich purple-brown.

Length, 3·5 inches.

Philippines, on the reefs.—Cuming.

The upper spines are more luxuriantly foliaceous than in *V. ceramicum*, and the spire shorter; in form, this shell appears to connect the latter with *V. cornigerum*. *Turbinella tubigera*, Anton, an unfigured species, may be the same.

V. TURBINELLUM, Linn. Pl. 21, figs. 16, 20–22.

Yellowish white and chestnut-black, stained and obscurely banded; aperture yellowish white, border of lip black-spotted.

Length, 2·5–3·5 inches.

Red Sea, Moluccas, Philippines, Mauritius, Central Polynesia.

A rather smaller, but proportionately heavier, shell than *V. ceramicum*, with a much shorter spire.

Messrs. Adams and Reeve* state that the animal crawls with difficulty, appearing to labor under the weight of its heavy shell as the tortoise does with its carapace. *Turbinella variolaria*, Lam. (fig. 16), is a very young individual of this species, as demonstrated by a series of specimens before me.

* Voy. Samarang, 43.

V. CAPITELLUM, Linn. Pl. 19, fig. 25; Pl. 21, fig. 24.

Yellowish white, or light brown. Length, 2–3 inches.

West Indies.

V. mitis, Lam. (fig. 25), is a depauperate shell, not adult.

V. GLOBULUS, Lam. Pl. 21, fig. 17.

Yellowish brown, the revolving ribs whitish; interior of aperture and columella flesh-pink. Length, 1·25–1·75 inches.

W. Africa; West Indies.

Family VOLUTIDÆ.

The shells of this family are conspicuous and showy, and many of them rare; like the Cypræidæ and Conidæ, the acquisition of fine collections is frequently deemed worthy the expenditure of much time and money, and information upon the classification and determination of the species is eagerly sought. The consequences of this state of things are a large number of so-called species erected out of mere individual variations and a succession of classifications, each vying with the other in complexity. Neither the anatomy of the animals nor the differences between the shells justify the numerous generic divisions which have been proposed, and I gladly follow one of the latest as well as the most judicious of systematists, Mr. H. Crosse, in reducing most of them to mere groups within the genus Voluta. H. and A. Adams included a classification of Volutidæ in their "Genera of Recent Mollusca," Vol. 1, 1853. They were shortly followed by Dr. J. E. Gray, in "Zool. Proceedings," 1855, "Catalogue of the British Museum," xxvii, 1855, and "Guide to the Mollusca," 1857. The latter was partially adopted, and partially adapted to their former system by Messrs. Adams, in the "Appendix" to their work, published in 1858. Crosse's arrangement of the Volutes was published in "Journal de Conchyliologie," 3 ser. vi, 105, 1866; and xi, 263, 1871. Finally, Mr. Wm. M. Gabb published a modified version of Dr. Gray's system, including, however, the fossil genera, omitted by his predecessors. (Proc. Philad. Acad., 286, 1876.)

Two subfamilies have been made by Gray, Gill and others, based primarily upon differences in the lingual dentition. One of them, containing the genera *Amoria* and *Volutimitra* of Gray,

is instituted upon the examination of the dentition of a single species in each of these genera. That of *Amoria Turneri*, Gray, has been supposed by some conchologists to be an error on the part of that very able but exceedingly hasty and careless observer, as it appears to correspond very closely with that of a nudibranchiate mollusk, *Favorinus albus*, Alder and Hancock.* The dentition of *Volutimitra Grœnlandica* is similar, but with the addition of lateral teeth. We are not willing to remove a number of tropical species heretofore classed in this genus along with this single boreal one, from the Mitridæ to the Volutidæ, merely upon the evidence of the armature of this one species. The shell of *Volutimitra* has no intimate relationship with *Voluta*, but it is essentially a Mitrid. Gray included a considerable number of species of Marginellidæ in his subfamily Volutimitrina, but these were excluded by H. and A. Adams. It remains to specify an entirely different type of dentition, as discovered by Dr. P. Fischer in *Voluta musica*, which approaches that of species of Marginellidæ. It is evident that such diversity in the few tongues examined must be fatal to the classification of the group upon this character, until we shall have determined the dentition of every species before assigning to it a definitive position. Fischer thus tabulates the dentition of the family, as far as known:

1. Formula: 0 · 1 · 0.	1. Tooth tricuspid, with large lateral points. *Cymbium, Melo, Voluta, Lyria.* (Pl. 2, figs. 2, 3, 4, 7.)
	2. Tooth unicuspid, with concave base. *Amoria.* (Pl. 2, fig. 5.)
	3. Tooth multicuspid, very transverse. *Voluta musica.* (Pl. 2, fig. 6.)
2. Formula: 1 · 1 · 1.	*Volutimitra.* (Pl. 2, fig. 8.)

This last form I place in Mitridæ, as explained above.

Volutes are rarely collected with their animals, except when they are accidentally thrown ashore after a storm. They have therefore been said to live in the depths of the sea. The reason they are not found is that, like the Naticæ, they bury themselves under the surface as soon as the water falls and the sand is left

* Mörch, Jour. de Conch., xv, 241, 1867.

dry by the tide; they are only to be procured by digging for them, or when a violent storm disturbs the sand and throws them on the beach.*

The above remark is upon Australian species, but those of the southern extremity of South America are also found numerously in shallow water, feeding on Mytilus, etc.; nevertheless other species have been dredged from great depths, as *V. papillosa* at 1900 fathoms.

The cavity of the nucleus in a cut specimen of the shell of *V. vespertilio* is nearly entirely filled with an amber-colored pellucid calcareous deposit; and the whole of the rest of the cavity is lined with a thick glossy deposit. In a cut specimen of *V. Hebræa* (the nucleus of which is destroyed) the cavity of the upper whorl is quite filled with a white glossy deposit, and a similar deposit lines the whole of the inner cavity of the shell.†

Synopsis of Genera.

* *No operculum.* (*An operculum in V. musica.*)

CYMBIUM, Klein. Shell oval-oblong, ventricose, thin; spire short, nucleus large, globular, forming an obtuse papillary apex; whorls few, forming a flat edge around the nucleus; aperture oblong, wide; columella with several oblique plaits; outer lip thin, simple. Dentition, Pl. 2, fig. 2.

MELO, Humphrey. Shell large, subovate, ventricose, thin; spire short, apex obtuse, papillary, persistent; whorls smooth, the last posteriorly coronated; aperture oblong, wide; columella with several oblique plaits, the anterior the largest; outer lip simple, acute, obliquely truncate in front. Dentition, Pl. 2, fig. 3.

VOLUTA, Linn. Shell ovate or subconical, thick, solid; spire usually short; shoulder of whorls usually angulated, sometimes nodose or spinous; aperture generally rather narrow; columella with a callous deposit and plaited; lip generally thickened, sometimes subreflected. Dentition, Pl. 2, figs. 4–6.

* * *With operculum.*

[VOLUTOLYRIA, Crosse. Shell with the obconic form of *Voluta*, longitudinally plicate; columella numerously plaited; operculate.

Unites the form and solidity of *Voluta* with the smaller size and

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* Dr. J. E. Gray, Ann. Mag. N. Hist., 310, 1868.

† Gray, Beechey's Voy., 134.

numerons plaits of *Lyria*. Differs from *Voluta* in possessing an operculum, and in dentition. I am unable to follow Mr. Crosse in this separation from *Voluta*, for several reasons:

1st. The dentition of only a single species (*V. musica*) of the Volutes with numerous columellar plaits has been examined, and there are others, *V. Hebræa*, for instance, which cannot be separated conchologically from *V. musica*, but the dentition of which is unknown.

2d. The assumed type of dentition of *Voluta* rests upon the examination of only three or four among the numerous species of the genus—it may differ widely in some of the others

3d. The presence of an operculum is proven in *V. musica*, but its absence is *not* proven in most of the Volutes, although we know it to be absent in several of them. The presence or absence of an operculum has but little value in the classification of some groups; indeed it is well developed or absent in the same species occasionally, as in *Volutharpa*, etc.

4th. If we assume *V. Hebræa* and *V. virescens* to be, with *V. musica*, Volutolyriæ, what shall we do with the groups *Harpula* and *Fulgoraria*, which form the passage into the Volutes with few plaits?

5th. If we adopt *Voluta*, Linn, or even the restricted *Voluta* of Gray, in either case *V. musica* is the type, and if a new name is required it is for those species the characters of which are different from *V. musica*.]

LYRIA, Gray. Shell ovately fusiform, solid; spire acuminate; whorls longitudinally ribbed; aperture ovate, rather narrow; columella with numerous transverse plaits; outer lip simple, acute. Dentition, Pl. 2, fig. 7.

The species are smaller than in *Voluta*, and Mitræform, connecting with the genus *Mitra*.

MICROVOLUTA, Angas. Shell small, ovately fusiform, solid, smooth, shining; spire as long as the aperture, apex papillary; whorls simple; aperture narrowly ovate; columella with four strong transverse plaits, the anterior one the smallest; outer lip thin, simple, slightly contracted at the base; base rounded, spout-shaped, with a flexuous bend upwards towards the columella, which is a little thickened and reflected below the plaits.

The above description is drawn up from the only known species, and probably many of its characters are of slight importance. The animal is unfortunately unknown.

Fossil Genera.

The following groups are enumerated by W. M. Gabb. They should probably all be considered as subgeneric under *Voluta* rather than as distinct genera.

VOLUTODERMA, Gabb. Shape similar to *Fulgoraria*, which it also resembles more or less in surface sculpture; apex not papillate; inner lip marked by from three to five well-marked folds, not very oblique, and of pretty uniform size. This is a group of shells characteristic of the cretaceous rocks and perhaps peculiar to them. They are all somewhat slender, and are marked by longitudinal ribs; the columella is always straight or nearly so, and the folds are as isolated and distinct as those of *Turbinella*. But the most strongly distinguishing character is the entire absence of the irregularly rounded mass at the apex of the shell, one of the best characters of *Fulgoraria*. Cretaceous of *United States, Europe and India*.

V. NAVARROENSIS, Gabb. Pl. 4, fig. 44. *California.*

VOLUTOMORPHA, Gabb. Shell elongate, fusiform; whorls cancellated by longitudinal and revolving ribs; columella with one very oblique fold, and sometimes one or more smaller secondary folds.

V. CONRADI, Gabb. Pl. 4, fig. 45. A cast. Cretaceous, *New Jersey.*

ROSTELLITES, Conrad. Narrow, subulate, with elongated spire, numerous subequal plaits on the columella, and the outer lip somewhat expanded anteriorly.

R. TEXANA, Conr. Pl. 4, fig. 46. Cretaceous, *Texas.*

VOLUTIFUSUS, Conrad. Fusiform; body-whorl finely striated or smooth, with the exception of the shoulder, which is sometimes tuberculated; columella plaited, folds two to three, sometimes very prominent, oblique; apex papillated; initial whorl acute, subspiral, narrow; beak produced, recurved or sinuous.* Miocene of Europe and America.

V. TYPUS, Conrad. Pl. 3, fig. 36. *North Carolina.*

ATHLETA, Conrad. Ovate, Voluta-shaped; spire short, acute; columella with plaits as in *Voluta;* a callus projecting on the shoulder, and covering a portion of the spire. Cretaceous. Miocene of Europe.

A. TUOMEYI, Conrad. Pl. 3, fig. 37. *Mississippi.*

LEIODERMA, Conrad. Shell largely covered with enamel; with very oblique columellar folds; outer lip somewhat emarginate on the upper part to its junction with the body-whorl; base deeply emarginate.

L. LEIODERMA, Conrad. Pl. 3, fig. 38. Cretaceous, *Mississippi.*

PTYCHORIS, Gabb. Differs from *Athleta* in the want of the characteristic callus, in being subglobular instead of subfusiform and angulated, with very oblique folds on the anterior part of the columella.

P. PURPURIFORMIS, Forbes. Pl. 4, fig. 47. Cretaceous, *India.*

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* I am by no means convinced that *Volutifusus* should be separated from *Scaphella*.—Gabb.

[FICULOPSIS, Stoliczka, referred by him to the Volutidæ, is a *Ficus* with the addition of columellar folds. I agree with Mr. Gabb in including it in the Ficulidæ = Pyrulidæ.]

PLEIOPTYGMA, Conrad. Subfusiform; aperture long; columella with very oblique plaits, numerous, alternated in size, or irregular; the largest being the second one from above.

P. CAROLINENSIS, Conrad. Pl. 4, fig. 48. Miocene, *So. Carolina.*

CRYPTOCHORDA, Mörch. Shell smooth, Volutiform, enameled; columella without plications. Tertiary. Seems to connect *Voluta* with *Harpa.*

C. STROMBOIDES, Gmel. Pl. 4 fig. 47. Tertiary, *France.*

[OTOCHEILUS, Conrad. An uncharacterized genus placed by its author in Volutidæ. The type is lost, but the second species, *O. Mississippiensis*, Conrad, has been referred by Prof. Heilprin to *Cythara* in Pleurotomidæ - to which determination I agree.]

GOSAVIA, Stoliczka. Shell convolute, spire turbinated, last whorl inversely conical; aperture narrowly elongate, base emarginate; lip sinuate at the suture; columella plicated, anterior plicæ strongest. Cretaceous, Europe and India.

Stoliczka refers this genus to Conidæ, as he does also doubtfully *Imbricaria* and *Cylindra*, which he considers closely related. The two latter are known to be in no way closely related to *Conus*, and *Gosavia* possesses every characteristic of a Volute; indeed I cannot separate it readily from such forms as *V. musica.*

G. INDICA, Stol. Pl. 4, fig. 49. *India.*

Genus CYMBIUM, Klein.

The animal is large compared to the size of the shell, when expanded. The foot partially covers the shell, which is sunk into its substance. There is no operculum. Ovoviviparous; the young when born being of a large size and covered with a shell with a large irregular callous apex. They leave the parent when they have attained a length of about an inch; the brood appearing to consist of four or five individuals. Adanson observes that the high winds of April cast the "yet" up in such vast quantities as sometimes to cover the shore; the natives of Senegal using them as food. The species are limited in distribution; one being an inhabitant of the Mediterranean Sea, the others of the West Coast of Africa.

Cymbium is separated from *Melo* by its flat or slightly

channeled shoulder and want of coronal spines. When fresh, the epidermis is more or less covered by a thin glaze deposited by the enveloping mantle.

Gray, Reeve and Sowerby have published monographs of this genus; the two latter with illustrations. For the figures of *Cymbium*, *Melo* and *Voluta*, in the present work, I am mainly indebted to Sowerby's Thesaurus; they are usually much reduced in size, but the dimensions of the species are indicated in my text.

C. PROBOSCIDALE, Lam. Pl. 22, figs. 1–4.

Yellowish brown, or light salmon-color; epidermis very thin, brown, over which the mantle of the animal deposits a thin glaze; columellar plaits four in the adult, of which the last is small.

Length, 1 inch to a foot or more.

W. Coast of Africa.

C. porcinum, Lam. (figs. 3, 4) is the young of this species, having only two columellar plaits, and the ends of the shell not so attenuately contracted; it has generally been distinguished as a species with some doubt, but the specimens before me afford good evidence of the gradual evolution of *proboscidale* from *porcinum*. Between the glaze and the epidermis particles of sand and even small organic bodies are frequently imprisoned; the former giving the surface a minutely pustulate appearance.

C. RUBIGINOSUM, Swains. Pl. 22, fig. 6.

There is some little difference of form between this and the last species, but I scarcely think them distinct. It was referred to Australia by Sowerby, and misunderstood and made a synonym of *C. cymbium* (not of Linn) by Dr. Gray = *C. cisium*, Lam. Its true locality is N. W. Coast of Africa. Length, 4·5 inches.

C. CISIUM, Lam. Pl. 22, figs. 5, 7, 8.

Shell light yellowish brown, elegantly marbled with chestnut.

Length, 3–5 inches.

W. Africa.

Gray and others have referred *C. cymbium*, L., to this species, but the evidence given by Mr. Reeve that the true *C. cymbium* = *C. proboscidale* is pretty conclusive.* *C. gracile*, Brod. (figs. 5, 8), appears to be a form of this shell.

* Ann. Mag. N. Hist., 3d ser. vii, 271.

C. NEPTUNI, Gmel. Pl. 22, figs. 9–12; Pl. 1, fig. 3.

Yellowish or reddish brown. Length, 6–10 inches.

W. Africa.

C. Tritonis, Brod. (fig. 10), is a synonym. The shell when young and in good condition, is frequently mottled with lighter and darker brown, and this color-variety has received the name of *C. Navicula*, Gmel. *C. patulum*, Brod. (fig. 11), is another synonym. I figure, actual size, a quite young individual, with protruding spire (fig. 12) which afterwards becomes immersed in the succeeding whorls.

C. OLLA, Linn. Pl. 22, fig. 13.

Pale fulvous. Columella two-plaited. Length, 3·5–5 inches.

Southern Spanish shores of the Mediterranean, N. W. Africa, Portugal, Canaries.

Genus **MELO**, Humphrey.

The apex of the shell is spiral, regular, very different from the shapeless apex of *Cymbium*. The distribution of *Melo* is exclusively tropical and exotic, ranging from the Indian Ocean to Australia. Messrs. Adams state that the animal of this genus, like *Cymbium*, is ovoviviparous, the young ones being arranged in the oviduct of the female in a long string, without egg-shells.

** Spire covered or enclosed, unarmed.*

M. INDICA, Gmelin. Pl. 23, fig. 14.

Lemon-yellow to orange-color, with two or three revolving zones of tessellated spots; sometimes without spots when large. Epidermis very thin, light olive, not often seen on cabinet specimens. Length, 6–9 inches.

Indian Ocean.

** * Spire exposed, not produced, surrounded by decumbent spines.*

M. TESSELLATA, Lam. Pl. 23, figs. 15, 16.

Yellowish or orange, under a light olive epidermis, with or without two or three revolving zones of brown tessellations. Length, 6 inches.

Indian Ocean.

The species of coronated Melos are very hard to separate, and

in fact, the number and direction of the spines vary so in different species that the distinction appears very arbitrary.

** * * Spire exposed, not produced, spines erect, spreading.*

M. ÆTHIOPICA, Linn. Pl. 23, figs. 17–21.

Yellowish or orange; generally maculated and tessellated with chestnut, usually in revolving zones. Length, 6–12 inches.

Indian Ocean, Manilla, Japan.

In deference to the opinion of the British conchologists, the following "species" may retain their names as stages of variation in the form, coloration and development of spines. It is easy to point out from the numerous excellent illustrations given by Reeve and Sowerby, how these authors differ in estimating these so-called species, and how even some of their figures refute their arguments for distinctness.

Var. REGIA, Schubert. Fig. 18.

Yellowish brown, with zones of white blotches.

Var. NAUTICA, Linn. Pl. 23, fig. 19.

Spines close-set, converging towards the apex (also towards *M. tessellata*, very decidedly). Length, 6–8 inches.

Var. BRODERIPII, Gray. Pl. 23, figs. 20–21.

Spines very numerous, small. Length, 8–14 inches.

M. DIADEMA, Lam. Pl. 23, figs. 22–28.

Variable in proportions but generally more narrow than *M. Æthiopica;* spines few and long. Yellowish, marked with chestnut, frequently forming two interrupted zones connected by irregular or zigzag markings. Epidermis thin, light olive. Length, 6–13 inches.

Indian Ocean; Australia.

Its narrower coronal, and the few long spines composing it are the best distinctive characters from *M. Æthiopica.* As in that species I include here as varieties, several forms which have been heretofore considered distinct. *M. armata*, Lam. (figs. 24, 25), is a synonym.

Var. DUCALIS, Lam.

This, and its synonym *M. umbilicata*, Brod. (fig. 26), are more

elaborately painted than the type, the inter-zonal markings forming an elaborate network of chestnut-brown veins.

Moreton Bay, Australia.

I am unable to separate from this variety the shell described by Dr. J. E. Gray as *M. Georginæ*. Mr. Reeve speaks in a knowing manner of "a separate system of characters in *M. ducale* and *M. Georginæ*," distinguishing them from *diadema*, but he neglects to point out these distinctions.

Var. MILTONIS, Gray. Fig. 28.

Shell more cylindrical, consequently showing more of the spire.

Swan River, Australia.

Genus VOLUTA, Linn.

The animal is essentially like those of *Cymbium* and *Melo*, but the mantle is not usually so greatly expanded, nor is the foot proportionally so large.

This genus is oviparous, at least the South American species are so, and M. Duhant-Cilly has given us some interesting particulars concerning them.* He noticed the Volutes in clear shallow water in Magellan's Straits, and, with the aid of natives, procured specimens—which nearly all grasped dead shells of *Venus exalbida*, a common bivalve of that locality. Upon examining these shells they were found to contain within the cavity of one of the valves, a round, slightly convex membrane, comparable for size and transparency with a watch-glass. The contents appeared to be merely a milky fluid in some cases, but in others, the egg having advanced further in development, three or four small, but perfectly formed Volutes could be seen swimming in the fluid, which had become transparent. D'Orbigny also† collected large numbers of these eggs, and in the month of February saw the young Volutes, four of five in number, in each. The containing membrane, which becomes corneous, he describes as 80 to 100 millimetres in length, more than half the size of the animal which lays it, and he conjectures that it expands after coming into contact with the water.

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* Revue Zoologique, 167, 1840.

† Voy. Am. Mérid., 424.

Voluta of Linnæus, Lamarck, and other old authors, comprised many species of other genera, but in restricting it more and more, until the advanced school of conchologists have left to it but a couple of species, the citation of Linnæus as its author has generally been retained. Mr. H. Crosse has, however, eliminated from the genus thus restricted, the *V. musica*, which is the *first* actual *Voluta* in Linnæus' list (after a crowd of Auriculæ, Columbellæ, Marginellæ, Mitrids). In compensation, he has reduced the numerous genera of H. and A. Adams, and Gray, to sections, retaining *Voluta* in something like the same comprehensive sense as that in which we use *Helix*, *Fissurella*, *Pleurotoma* and other old generic names. These "sections" are rather circumscribed geographically, yet the range of the entire genus is very great, including the Indian Ocean, Japan, Alaska, Australia, Eastern Polynesia, Atlantic coasts of Southern South America, to West Indies, Southern Africa, etc. No species exists in the seas of Europe, although they were numerous during the tertiary epoch; *V. abyssicola*, an African species, is the sole surviving representative of the group to which most of these small tertiary species belonged. Australia is the metropolis of the Volutes, and, as M. Crosse remarks, a triangle the respective points of which shall include Ceylon, Japan and New Zealand will cover the habitats of about 80 per cent. of the species.

Sect. 1. **Voluta** (*typical*), Gray.

Longitudinally plicate, plicæ becoming prominent on the shoulder, columella with four or five principal plaits, and several smaller ones. Operculum (of *V. musica*) fusoid, narrowly elongated, with terminal nucleus.

V. MUSICA, Linn. Pl. 24, figs. 29–34, 38.

Color generally pale yellowish or brownish, punctate, strigate and clouded with chestnut and other colors, with three revolving, more or less distinct bands of distant, parallel, fuscous lines, crossed by strigations; these bands are bordered by a row of dark spots, and the space between these rows is finely punctate with chestnut; outer lip dark chocolate, or chestnut-spotted.

Length, 2–4 inches.

West Indies.

The coloration varies greatly, as does also the degree of development of the plications, causing Lamarck and others, before this great variability became known, to describe different forms of the species under distinct specific names. These are *V. thiarella*, Lam. (fig. 31); *V. Guinaica*, Lam. (fig. 32); *V. carneolata*, Lam.; *V. lævigata*, Lam.; *V. sulcata*, Lam. (fig. 33); and *V. polypleura*, Crosse (fig. 34); the latter being the most distinctive of these varietal forms. I add a figure of the animal, with operculum (fig. 38); the dentition is also illustrated (Pl. 2, fig. 6).

V. VIRESCENS, Solander. Pl. 24, figs. 35, 36.

Light chestnut or ash color, with distant white bands; frequently numerous punctations of dark chestnut color are scattered over the surface; outer lip with dark spots.

Length, 2·5 inches.

West Coast of Africa.

V. pusio, Swainson (fig. 36), is a short form of this species, the surface in a worn condition.

V. HEBRÆA, Linn. Pl. 24, figs. 37, 40.

Ovate, thick, pale fulvous with undulated angular vein-like lines of chocolate color, and sometimes interrupted bands of the same. Length, 3·5–4·5 inches.

West Coast of Africa. Brazil (Nägely!)

Var. TURBINATA, Kiener. Fig. 40.

Darker reddish brown, without the hieroglyphic markings of the type-form.

Sect. 2. **Harpula**, Swains.

Shell oval-conic, spire with a papilliform but small summit; columella with larger plaits below, and additional smaller ones above, but less numerous than in the preceding section; exterior lip thickened within, sharp without.

V. INTERPUNCTA, Martyn. Pl. 24, fig. 39.

Flesh-color with numerous revolving series of chestnut linear spots, and frequently, under them, two or three series of revolving much larger and paler spots, sometimes also with longitudinal chestnut streaks. Length, 2·5–3·5 inches.

Ceylon; Indian Ocean.

Reeve says, "I quite agree with Mr. Sowerby in the propriety of abandoning the (earlier Linnæan) name *Lapponica* given to this species, indicating a country and climate in which such a mollusk could not by any possibility exist. Instead of inhabiting the Arctic shores of Lapland, it is a native of the seas of tropical India. The error did not, however, originate with Linnæus. The species was known before his time to Dutch naturalists, as the *Lapphoorn* or *Lapphoren*, signifying the Flap-Ear or Dog's-Ear Shell. This seems to have been corrupted into *Ailée Laponne*, *Alata Lapponica*, *Voluta Lapponica*, and Meuschen and Rumphius compounded the name *Laplandsche Lapphoorn*. It only remains a matter of wonder that, whilst Seba described the species as an exotic shell from India, the error should have remained so long unexplained."

V. VEXILLUM, Lam. Pl. 31, fig. 153.

Flesh-color, with distant orange revolving bands, and sometimes narrower intermediate ones; occasionally the surface is longitudinally clouded with orange in addition to the above specific pattern. Length, 3–4 inches.

Indian Ocean.

Sect. 3. **Fulgoraria**, Schumacher.

Shell oblong-fusiform; spire moderately elongated, terminated by a papillary summit with the apex lateral, instead of central and vertical as usual in spiral shells; surface plicate longitudinally, crossed by engraved revolving lines; columellar plaits six or seven, or more; lip thickened within, its margin slightly crenulate.

The swollen bead-like apex, the initial whorl of which is lateral, is a curious feature of this group, which may indicate some important difference in the development of the mollusk—which is so far unknown to science.

V. RUPESTRIS, Gmelin. Pl. 24, figs. 41, 42.

Yellowish flesh-color, with zigzagged longitudinal chestnut lines; interior flesh-color. Length, 3–6 inches.

China, Japan.

V. Hamillei, Crosse (fig. 41), is described from a large, yet immature specimen of *V. rupestris*, as indicated by Lischke in his work on the Japanese Mollusca.

Sect. 4. **Vespertilio**, Klein.

Shell oval-oblong, more or less ventricose. Spire terminated by a regularly spiral summit, papilliform, but having an apparently crenulated nucleus, caused by the presence of numerous little tubercles, more or less apparent. Columella four-plaited.

V. VESPERTILIO, Linn. Pl. 25, figs. 43–49, 52.

Yellowish flesh-color, covered by an irregular network of chestnut brown, which is occasionally confluent into broad angulated blotches. Length, 3–5 inches.

Philippines Moluccas.

One of the most variable species in form, development of spines and folds, and coloring. I figure *V. pellis-serpentis*, Lam. (fig. 46), *V. mitis*, Lam. (fig. 49), *V. serpentina*, Lam. (fig. 47), and *V. lineolata*, Küster (fig. 52). Also a reversed specimen (fig. 45).

V. PULCHRA, Sowerby. Pl. 25, figs. 50, 51.

Pale flesh-color, with white specks, and small chestnut dots, irregularly disposed in three bands. Length, 2·5–3 inches.

N. and N. E. Australia.

V. Wisemani, Brazier (fig. 51), is acknowledged by its author to be a variety only, of *V. pulchra*.

V. NIVOSA, Lam. Pl. 25, fig. 53.

Grayish flesh-color, sprinkled with small white specks; with two revolving bands, consisting of longitudinal, subparallel, more or less interrupted chestnut-colored lines; columella and aperture saffron-yellow. Length, 2·5–3·5 inches.

W. Coast of Australia.

V. NORRISII, Gray. Pl. 25, fig. 55.

Grayish brown, flecked with white and less numerously with brown; there are two interrupted bands of darker color, here and there marked with longitudinal lines; the shoulder also is darker and strigate with brown; aperture light chocolate within. Length, 2·5–3 inches.

W. Coast of Australia.

The markings on the bands frequently assume a somewhat irregular checker-board appearance. Dr. Gray described this species in 1838, and Sowerby (probably finding a specimen

labeled, but without authority for the name attached) redescribed it under the same name in 1844 ; since then, the species has been quoted in all the monographs as well as in Crosse's list as Sowerby's, and Gray himself, forgetting that he had described it, quotes it as of Sowerby in his British Museum monograph.

V. SOPHIÆ, Gray. Pl. 25, fig. 57.

Yellowish white, with two interrupted darker bands, which are bordered on either side by a line of chestnut spots.

Length, 2·5 inches.

W. Coast of Australia.

Perhaps a variety of *V. Norrisii.*

V. RUTILA, Brod. Pl. 25, figs. 56, 54.

Shell variegated, whitish and saffron-red, forming subtrigonal blotches, and irregular veins, and usually indicating obscurely by their confluence and broadening two revolving bands ; sometimes slightly tuberculate on the shoulder ; aperture salmon-red within. Length, 3–3·5 inches.

N. E. Coast of Australia ; New Guinea.

Var. INNEXA, Reeve. Fig. 54.

Lighter colored, tuberculate.

Louisiade Islands, near New Guinea.

V. PIPERITA, Sowb. Pl. 26, fig. 60 ; Pl. 27, figs. 75, 76, 78.

Finely netted and peppered with orange-red on a whitish ground, with three interrupted bands of large orange-red spots, and columella and interior of aperture same tint.

Length, 2·5–3 inches.

Solomon Is., Woodlark Isl., near New Guinea.

V. Rückeri, Crosse (fig. 75), *V. Macgillivrayi*, Cox (fig. 76), and *V. Ceraunia*, Crosse (fig. 78), are all mere color-varieties of this species.

Sect. 5. **Aulica**, H. and A. Adams.

Agreeing with the preceding section in general form and principal characters, the summit of the spire differs in having a completely smooth instead of a tuberculated surface.

V. AULICA, Sowb. Pl. 26, figs. 61, 62.

Flesh-colored, with large salmon-colored clouds, sometimes

forming three very broad, interrupted bands, sometimes confluent, irregularly covering most of the surface; interior flesh-yellow. Columellar plaits oblique. Length, 3·5–4·5 inches.

Sooloo Is.

V. Cathcartiæ, Reeve, Pl. 27, fig. 79.

Orange and flesh-white, the former making an irregular zigzag or netted pattern, with three bands of dark chocolate spots.

Length, 3·5 inches.

Habitat unknown.

The figure of the type resembles *V. piperita* except in its smooth apex, rather more closely than *V. aulica*, with which M. Crosse compares it.

V. Deshayesii, Reeve. Pl. 26, fig. 63.

White or pink, with orange-red irregular clouded markings, and a central band whereon they do not appear; aperture orange-color; columellar plaits much stronger than in *V. aulica*, and nearly transverse. Length, 3–4 inches.

New Caledonia.

V. Rossiniana, Bernardi. Pl. 27, fig. 64.

Flesh-color, with longitudinal angular markings of chestnut-brown. Length, 7 inches.

New Caledonia.

The spire is more elevated, the spines less developed than in *V. imperialis;* the plaits on the columella are five in number (four in *imperialis*) and more transverse, the outer lip more expanded; yet it may be only an extreme variety of that species.

V. luteostoma, Desh. Pl. 25, fig. 58.

Shell resembling the last species, but smaller, and having four plaits only on the columella—which, however, are transverse like it, and not oblique as in *V. imperialis*, The interior of the aperture has the orange-coloring of *V. Rossiniana.*

Length, 2·5 inches.

Habitat unknown.

Certainly very closely allied to the preceding species.

V. imperialis, Lam. Pl. 26, fig, 65.

Fulvous, marked with angular, interlacing chestnut lines,

sometimes confluent into trigonal blotches, and occasionally forming interrupted bands. Length, 5–8 inches.

Philippine Islands.—Cuming.

V. PUNCTATA, Swains. Pl, 27, fig. 80.

Pale fulvous, with numerous small light chestnut dots, sometimes confluent into larger spots, forming interrupted bands. Length, 3 inches.

Eastern Australia.

The figures in Swainson, Sowerby and Reeve represent an immature individual, the only one known until ten years ago, when the adult was first figured by Dr. Cox.

V. HARGREAVESI, Angas. Pl. 27, fig. 82.

Reddish brown, with an indication of two darker bands, ornamented with numerous, scattered longitudinal and somewhat angular blotches of white; columella and border of lip tinged with orange, aperture flesh-color within. Length, 3 inches.

Habitat unknown.

The specimen described is so far unique.

V. BEDNALLI, Brazier. Pl. 26, fig. 66.

Whitish, with four narrow chestnut-colored revolving bands, which are connected by angular longitudinal chestnut markings; aperture white within. Length, 3·3 inches.

Port Darwin, Torres Sts., N. Australia.

V. SCAPHA, Gmelin. Pl. 26, fig. 68.

Shell ponderous, smooth, yellowish flesh-color, with zigzag longitudinal chestnut markings, sometimes widening into series of irregular spots, forming two interrupted bands. Length, 3·5–5 inches.

Singapore, on the reefs.—Cuming.

V. MAGNIFICA, Lam. Pl. 26, fig. 70.

Rather thin; pale fulvous, with three broad orange-chestnut bands marked with white and fuscous angular spots, intermediate surface reticulated with pale orange angular lines; columella and interior orange or salmon-color. Length, 6–8 inches, or even a foot.

East Coast of Australia.

One of the largest species of the genus; it is found half-

burying itself amongst weed and ooze on sandy and muddy flats beyond tide-mark.

V. Junonia, Chemn. Pl. 26, fig. 67.

Pale yellowish or whitish, with numerous rather large rounded square chestnut-colored spots arranged in revolving series; interior flesh-white. Length, 3·5–4·5 inches.

East and West Coasts of Florida.

It is an inhabitant of deep water, and is somewhat rarely obtained and highly prized by collectors. Specimens have been sold as high as two hundred dollars, but of late years the value has greatly decreased in consequence of increased supply.

V. dubia, Brod. Pl. 27, figs. 77, 81.

The spire is proportionally longer, the spots more sharply square than in *V. Junonia*, the longitudinal ribs, which in that species are barely visible upon the first whorl below the embryonal apex, show traces of their existence as far as or even including the body-whorl. *V. Junonia* is spirally sculptured towards the base of the body-whorl, whilst in this species the sculpture covers the entire whorl. Length, 3·6 inches.

Caribbean Sea, off the Southern and Western Coasts of Florida.

This shell was first figured as *Fusus tessellatus* by Schubert and Wagner, and subsequently described by Broderip as *V. dubia* (fig. 81), but the shell was only known in an immature and faded condition until Dr. Dohrn in 1879 gave a full description with figures of what he supposes to be the adult shells. My impression is that it is merely an elongated variety of *V. Junonia*, but the question of identity can only be settled satisfactorily when a larger mass of material shall be at the disposal of naturalists, than is now available.

V. Kaupii, Dunker. Pl. 26, fig. 69.

All the whorls except the embryonal apex are slightly plicate below the sutures; last whorl obtusely angular; pale yellowish red, marbled irregularly with a darker tint. Length, 2·25 inches.

New Zealand?

Probably not mature; the type is the only specimen known.

V. FLAVICANS, Gmelin. Pl. 26, fig. 71; Pl. 27, fig. 84.

Yellowish gray, fasciculated with brown beneath the sutures; surface marbled, strigated and reticulated with brown.

Length, 3–3·75 inches.

N. Australia.

V. signifer, Brod., is an elongated *flavicans*, with the lip not quite mature. *V. Tissotiana*, Crosse (fig. 84), is also a variety.

V. EXOPTANDA, Sowb. Pl. 26, fig. 72.

Pale rose-orange, densely promiscuously painted throughout with sharply waved fine chestnut-red lines; columella and interior of shell orange-color. Length, 4 inches.

Port Elliott and Port Lincoln, Australia.

Is *V. Hargreavesi*, Angas (Pl. 27, fig. 82), a possible variety of this species?

V. AUSTRALIÆ, Cox. Pl. 26, fig. 73.

Reddish orange, with dark chestnut undulated longitudinal markings. Length, 2·5 inches.

Bass Straits, Australia.

The sutures are said to be vitrified, a character of the next group, *Amoria;* from which it differs in having only four columellar plaits. Appears to be rather too closely allied to *V. exoptanda*. Mr. Brazier considers it a variety of *V. undulata*, Lam.

V. GRAYÆ, Crosse. Pl. 26, fig. 74.

Yellowish, with zigzag longitudinal brown lines, increased in thickness so as to indicate three interrupted revolving bands.

Length, 5·5 inches.

Northwest Coast of Australia.

Described by Gray as *V. Maria-Emma*, and the name very properly changed by Crosse because not binomial; and if permitted to stand in this case, some Spaniard having baptismal names enough to fill half a page might have them all immortalized in a single species. This species is, so to speak, intermediate between *Aulica and Amoria*, for to the nucleus characteristic of the first group it unites the system of coloration and suture of the second.

V. KINGI, Cox. Pl. 27, fig. 86.

Yellowish flesh-color, with a very few slightly apparent darker zigzag lines. Length, 3 inches.

King's Isl., Bass Straits, Australia.

Supposed by some conchologists to be a variety of *V. undulata*, Lam., but appears to differ in its proportions, in the convexity of the spire-whorls, in having only four columellar plaits, etc.

V. MARMORATA, Swainson. Pl. 28, fig. 89.

Slightly coronate; yellowish flesh-color, with irregular strigations and angular, flexuous, longitudinal brown lines, faintly indicating two revolving bands. Length, 4–5 inches.

East Coast of Australia.

Sect. 6. **Amoria, Gray.**

Shell fusiform, smooth and polished; spire conical, with a small, more or less pointed nucleus; sutures slightly callous; columella with five oblique, more or less developed plaits.

V. UNDULATA, Lam. Pl. 28, figs. 88, 87.

Pale fulvous, with undulated narrow chestnut, longitudinal lines. Length, 3–3·5 inches.

E., W. and S. Australia, Tasmania.

V. Angasi, Sowb. (fig. 87), is only a form of *undulata* with shorter spire. Mr. Brazier thinks that *V. Sclateri*, *V. Kingi*, and *V. Australiæ* of Cox, are all mere varieties of this species.

V. SCLATERI, Cox. Pl. 27, fig. 83.

Pure white, without markings. Length, 3 inches.

Tasmania.

Perhaps a variety of *V. undulata*, Lam.

V. TURNERI, Gray. Pl. 27, fig. 85; Pl. 30, fig. 123.

Whitish or flesh-yellow, with longitudinal, somewhat waved narrow chestnut lines; yellowish or light chocolate within the aperture.

N. E. Australia; W. Australia (V. Ellioti).

V. Ellioti, Sowb. (fig. 123), is not entitled to distinction even as a variety, and, together with several varietal names given by Gray himself, must merge in the synonymy.

V. VOLVA, Gmelin. Pl. 28, fig. 90.

Whitish, with three faint yellowish bands, upon which are a few longitudinal, pale orange strigations; yellowish brown or coffee-colored within. Length, 3 inches.

W. Australia; abundant.

Certainly very close to *V. Turneri*. The species was redescribed by Gray as *V. pallida*, but he subsequently united it with *V. Turneri*. The patterns of coloration of the two species are different, and I find no connecting links.

V. MACULATA, Swains. Pl. 25, fig. 59.

Obconic, marked with chocolate spots forming two interrupted bands on an orange surface; aperture orange within.

Length, 2·25 inches.

East Australia.

The coloring is more vivid than in *V. volva*, and the spire is shorter, but the species may be only a variety of that shell, to which it bears the same relation that *V. zebra* does to *V. Turneri*.

V. ZEBRA, Leach. Pl. 28, fig. 91.

White or yellowish, with close-set, narrow somewhat waved longitudinal chestnut streaks; very pale yellow or pink within the aperture. Length, 1·5–1·75 inches.

East Coast of Australia.

Resembling *V. Turneri* in coloration, but differing in its smaller size, and short, obconic form.

V. LOROISI, Valenciennes. Pl. 28, fig. 92.

Light pinkish, with brown zebra-like stripes, columellar plaits almost obsolete. Length, 3 inches.

Habitat unknown.

Described from a worn specimen in the Paris Museum. It belongs to the same group as *V. zebra* and *Turneri*, and may be an overgrown specimen of the former.

V. CANALICULATA, McCoy. Pl. 28, fig. 95.

Whitish, with five revolving rows of chestnut-colored oblong spots; suture channeled. Length, 1·75 inches.

E. Australia.

V. Harfordi, Cox, described a few months later, is identical.

V. RETICULATA, Reeve. Pl. 28, fig. 93.

Light fulvous, triangularly marked with chestnut, forming three bands on the body-whorl; yellowish within.

Length, 3–4 inches.

W. Australia.

V. PRÆTEXTA, Reeve. Pl. 28, figs. 94, 96.

Pale fulvous, finely reticulated with chestnut, forming triangular spots, and two darker bands. Length, 1·5–2 inches.

North Australia.

Bears somewhat the same relation to *V. reticulata* that *zebra* does to *Turneri*. *V. reticulata*, Sowb. (fig. 96), is only a well-grown specimen of *V. prætexta;* although Sowerby afterwards renamed it *V. Reevei*.

Sect. 7. **Alcithoe**, H. and A. Adams.

Shell oval-fusiform, spire elongated, terminated by a papilliform summit; aperture oval-elongated, inner lip covered by a callous deposit, outer lip expanded and more or less reflected; columella with four, and more rarely five to seven oblique plicæ.

V. PACIFICA, Solander. Pl. 28, figs. 97–99.

Yellowish, with zigzag longitudinal chestnut markings, and frequently four interrupted revolving bands.

Length, 3·5–4·5 inches.

New Zealand.

The specimens vary much in the development of the shoulder-angle and tubercles, both being obsolete in some species. *V. fusus*, Quoy (fig. 98), is the immature shell.

Var. GRACILIS, Swn. (fig. 99), has been distinguished principally by its much smaller size,

V. KREUSLERÆ, Angas. Pl. 30, fig. 124.

Resembles *V. Pacifica*, but has a longer spire, is narrower, and differs in the painting of orange-brown maculations forming the three bands. Length, 2 inches.

So. Australia.

V. AMERICANA, Reeve. Pl. 28, figs. 100, 101.

Yellowish white, faintly banded and reticulated with orange-brown. Length, 1·75 inches.

Brazil.

Only a single specimen known. *V. Cleryana*, Petit (fig. 101), is the young of it.

V. FESTIVA, Lam. Pl. 30, fig. 125.

Rosy white, clouded with orange-red, with chestnut spots and bands formed of series of longitudinal flexuous chestnut strigations. There are three prominent oblique plaits at the lower part of the columella, and above them a number of oblique rugosities. Length, 4–5 inches.

East Africa.

One of the rarest of Volutes. The exact locality is unknown. D'Orbigny speaks of collecting it on the Patagonian coast, but he doubtless refers to *V. Magellanica*.

V. AFRICANA, Reeve. Pl. 30, fig. 127.

Orange-brown, with sparse hieroglyphic brown markings disposed in bands ; upper part of columella black.

Length, 2·5 inches.

E. Africa.

The type, which formed part of the Cuming collection, is not in good condition, so that the pattern of painting is obscure. It is closely related to *V. festiva*, but appears to differ in its greater proportional width and short spire.

V. MEGASPIRA, Sowb. Pl. 28, fig. 102; Pl. 30, fig. 132.

Reddish flesh-color, longitudinally marked with zigzag chestnut streaks, sometimes forming three obscure bands.

Length, 4 inches.

Japan.

An elegant smooth species ; rather thin, with the first volution of the papillary apex lateral instead of terminal—a character shared by some of the following species. The animal is a common article of food in Japan, yet the shell is rather rare in collections. *V. lyriformis*, Kiener (not Swains.), is apparently a variety of this species, although Mr. Crosse has recently characterized it under the name of *V. Prevostiana* (fig. 132).

V. FUSIFORMIS, Swainson. Pl. 28, fig. 103.

Fulvous or flesh-colored, with irregular, zigzag, longitudinal chestnut markings. Length, 6–7 inches.

Tasmania ; So. Australia.

V. FULGETRUM, Sowb. Pl. 28, figs. 104, 105.

Yellowish flesh-color, with broad, undulated, longitudinal, dark chestnut or chocolate streaks. Length, 4–5·5 inches.

So. Australia.

The spire is shorter, the shell is more shouldered, the painting is usually much broader than in *V. fusiformis*. Sometimes the markings include a faint, closer reticulation besides the above more prominent features, and occasionally bands are indicated. *V. fulgetrum*, in fact, is intermediate between *V. fusiformis* and *V. papillosa*, and very probably the three are merely diverse forms of one species.

V. PAPILLOSA, Swn. Pl. 28, fig. 106.

Very finely reticulated longitudinally with chestnut color on an orange-brown surface, with interrupted bands.

Length, 4–5 inches.

So. Australia; N. Tasmania.

Kiener unites, apparently, this species and *fusiformis* in his *V. Sowerbyi*. Specimens were brought up by the dredge from 1,900 fathoms, 25 miles off the coast of New South Wales (Brazier).

Var. MACQUARIENSIS, Petterd.

Shell same form and size as typical, but of a more or less intense yellow-color throughout, without any markings. It is not figured.

V. THATCHERI, McCoy. Pl. 30, fig. 126.

Pinkish white, with narrow chestnut reticulations.

Length, 4–5 inches.

Bampton Reef, near N. W. Coast of New Caledonia.

Appears to be very closely related to *V. Pacifica*, Sol.

V. ROADNIGHTÆ, McCoy. Pl. 30, fig. 128.

Pale brownish creamy white, with acutely angular zigzag, longitudinal, sparse markings of rich, raw-sienna brown.

Length, 6–4 inches.

So. Coast of Victoria, Australia.

Sect. 8. **Cymbiola**, Swainson.

Shell oval, thin, recalling the form of *Cymbium*. Spire more or less elongated, terminated by a slightly irregular, papilliform summit. Aperture large, the columellar side covered with a slight coat of enamel; columella usually with four oblique plications; outer lip sharp, occasionally slightly expanded. An American, and principally Antarctic group.

V. ANCILLA, Solander. Pl. 29, fig. 110.

Yellowish, with faded chestnut, longitudinal, irregular streaks. Length, 5–6·5 inches.

Coast of Patagonia.

This is the *V. Magellanica*, of Sowerby, Kiener and Gould, who describe the latter species as *ancilla*; the latter has an excellent figure of the animal.

V. STEARNSII, Dall. Pl. 30, fig. 130.

Livid purple, more or less obscured by an ashy white outer layer; exterior smooth, but not polished; aperture white and livid purple, with a dash of brighter purple at the posterior notch, and on the anterior portion of the callus.

Length, 4·13 inches.

Alaska; living from stomach of cod, dead on beach.

Very closely related to *V. ancilla*.

V. MAGELLANICA, Lam. Pl. 29, figs. 107, 108.

Yellowish white, generally irregularly painted with longitudinal, zigzag, brown streaks, sometimes interruptedly banded. Length, 5–6 inches.

Patagonia.

Var. TUBERCULATA, Swains.

Whorls with a more pronounced, tuberculate shoulder.

A wider species than *V. ancilla* but may possibly be a mere variety of it.

V. BECKII, Brod. Pl. 29, fig. 109.

Yellowish, with chestnut-colored, undulated, longitudinal streaks. Length, 11 to 14 inches.

Habitat unknown.

The Philadelphia Academy possesses a specimen of the largest

dimension given above. Although the habitat of the species is not known, it is very probably Patagonia.

V. Brasiliana, Solander. Pl. 29, figs. 113, 115, 111; Pl. 30, fig. 131.

Ventricose, with depressed conical spire; brownish yellow, without markings. Length, 4–6 inches.

So. America, from mouth of Rio de la Plata to Patagonia.

V. Ferussaci, Donovan (fig. 131), is almost certainly a worn specimen of this species. I have a shell before me, precisely the same shape, but with the tubercles slightly indicated on the shoulder. *V. rudis*, Gray (fig. 111), is usually considered a synonym of *Ferussaci;* Gray's figure represents a shell in very bad condition. The specimen figured in the Thesaurus corresponds so little with the description as to indicate a very vivid imagination on the part of the colorist of that work.

Sect. 9. **Volutella**, d'Orbigny.

Shell smooth, subcylindrical, with angulated whorls; spire acuminated, polished, and entirely covered by an enamel deposit, obliterating the suture-line more or less entirely; columella with three oblique plaits; lip sharp, not reflected. The development of a lobe of the mantle to cover the spire is a peculiarity in this animal not shared by the other species of the genus.

V. angulata, Swainson. Pl. 29, figs. 112, 121.

Pale yellowish; with longitudinal irregular chestnut lines. Length, 4–6 inches.

Mouth of Rio de la Plata to Patagonia.

The enamel deposit frequently projects above the spire into a beak (fig. 112), but is usually broken off in cabinet specimens.

Sect 10. **Psephæa**, Crosse.

Shell oblong-fusiform, very finely transversely striated and furnished with longitudinal ribs, disappearing towards the middle of the last whorl. Nucleus ? Columella furnished with two principal plicæ, above which there are two or three minute ones hardly visible; it presents also this peculiarity (in the adult shell), that these plicæ are situated so far within as to be invisible when the shell is placed right in face of the observer.

Internal margin strongly callous; external lip obtuse and thickened.

V. CONCINNA, Brod. Pl. 29, fig. 114.

Yellowish brown, with close-set, undulated, longitudinal chestnut lines. Length, 4–5 inches.

Japan.

At first sight this shell might appear to be related to *V. rupestris*, from the same locality, but it differs in several respects, and particularly in the character of the plicæ.

Sect. 11. **Ausoba**, H. and A. Adams.

Spire short and obtuse, terminated by a papilliform summit; last whorl coronated.

V. CYMBIOLA (Chemn.), Sowb. Pl. 29, figs. 118, 119.

Pale yellowish gray clouded with a darker tint, and punctate with chestnut; aperture light chocolate. Length, 3 inches.

Moluccas.

The name was changed by Kiener to *V. coronata* because *cymbiola* had already been used by Lamarck for another species —an error, as Lamarck had not used the name at all. *V. corona*, Chemn. (fig. 119), is only known by the figure of a juvenile shell in that author, copied by Sowerby in his Thesaurus. Mr. Crosse believes it to be distinct, but I cannot agree to this, as it appears to me to be a faded young *cymbiola*. The nucleus is supposed to be proportionally much larger, but it is really not larger than in Kiener's figure of *V. coronata*. Sowerby says that *corona* having, besides the four principal plicæ, several smaller ones above them, is a character not shared by *cymbiola*, yet a characteristic specimen of the latter, before me, has two very distinct smaller plaits above the four principal ones.

V. KIRKI, Hutton.

Widely oval, spire depressed; last whorl ornamented with a small number of blunt tubercles; columella with four very profound plications, the upper part with a thin callous deposit. Color yellowish brown. Length 1·75, diam. 1·57 inches.

New Zealand.

Said to be a *Cymbiola;* not figured. Possibly a young shell.

Sect. 12. **Volutilithes**, Swains.

Shell oval-fusiform, spire elevated, terminated by a pointed summit; whorls cancellated or longitudinally plicate; mouth oval-oblong; columella with numerous rudimentary or obsolete plicæ; lip thin. The group is represented by a single living species and numerous tertiary forms.

V. ABYSSICOLA, Adams and Reeve. Pl. 29, fig. 120.

Fulvous ash-color, encircled by three or four narrow chestnut bands. Length, 1·5 inches.

Cape of Good Hope, 132 fathoms.

Only the type specimen known.

Sect. 13. **Volutoconus**, Crosse.

Oblong, subcylindrical, longitudinally and transversely striate; spire short and obtuse, terminated by a rounded summit; columella with four slightly developed teeth; lip simple, slightly inflected in the middle; base with flexuous striæ.

V. CONIFORMIS, Cox. Pl. 30, fig. 129.

Yellowish brown, with three broad chestnut bands, and superposed upon the bands and interspaces irregular or triangular large and small white spots and blotches. Length, 70 mill.

N. W. Australia.

Has the system of coloration so frequently met with in a group of *Conus*.

Sect. 14. **Callipara**, Gray.

Shell oblong, subcylindrical; spire short, nucleus small; columella with two plications.

V. BULLATA, Swainson. Pl. 29, fig. 116.

Fulvous, with chestnut spots and angulated lines, and three darker bands of the same. Length, 2·5 inches.

Algoa Bay, So. Africa.

Resembles somewhat *Conus bullatus*.

V. BRAZIERI, Cox. Pl. 29, fig. 117.

Yellowish brown, with a wide irregular chestnut band, and chestnut markings. Length, 1·1 inches.

New South Wales.

The figure is enlarged. The spire is more sunken than that of *V. bullata*, but it may be only a color-variety of that species.

[Sect. 15. **Aurinia**, H. and A. Adams.

Shell oval-fusiform; spire terminated by a large mamillary summit; columella with obsolete, scarcely apparent plications; whorls of the spire finely transversely striated; lip simple, thin. This group was proposed for *V. dubia*, Brod., known only to Messrs. Adams and Crosse from juvenile examples. The species is closely related to, if not identical with, *V. Junonia*, and follows that species in this monograph; *Aurinia*, consequently, will not stand.]

Sect. 15. **Mamillana**, Crosse.

Shell widely oval, ventricose, rather thin, intermediate between *Voluta* and *Cymbium*; nucleus papilliform, very strongly developed, excentric and lateral; columella with a few oblique plicæ; lip thin.

V. MAMILLA, Gray. Pl. 29, fig. 122.

Yellowish, strigated with brown. Length, 6–8 inches.

Tasmania; Australia.

The first whorl of the spire is completely lateral in this species, as in *V. rupestris*.

Undetermined Species.

V. NANA, Anton. Belongs to *Vespertilio* group. No locality given.

V. LARGILLIERTIANA, d'Orb. (Related to *V. pallida*, Gray.)

Seas of India.

V. PUMILIO, Brusina. *Dalmatia.*

Not figured. Shell ovate, transversely closely striate; spire very short, apex obtuse; lip simple, acute; columella subuniplicate. I do not know where to place this species; it is certainly *not* a *Voluta*. Length, 7–16 mill.

V. MOLTKIANA and V. SPENGLERIANA, Martini, H. and A. Adams' Genera, i, 161.

Genus **LYRIA**, Gray.

Dr. Paul Fischer, who has studied the anatomy of *Lyria deliciosa*,* finds it to be essentially the same as that of *Voluta*,

* Jour. de Conch., xv, 355, 1867.

except in the presence of an operculum and in the dentition (Pl. 2, fig. 7). The shell, however, presents certain modifications from *Voluta* which, in connection with the operculum, suffice for the establishment of a legitimate artificial group, which may be characterized by the narrowness of its mouth, the predominance in size of the two columellar plications nearest the base, and the transverse rugosities covering the inner lip above the plications, their comparatively small size and mitriform aspect, and the externally thickened lip. The distribution is wide, including West Indies, West Coast of Central America, East Coast of Africa, Moluccas, Japan, Australia, etc. A few fossil species may be here referred; and notably *V. harpula*, Lam., of the Paris basin. The classification of the species is based on that proposed by Mr. H. Crosse.*

* *Shell smooth.*

L. DELICIOSA, Montr. Pl. 31, figs. 133–135.

Pinkish gray, with distant revolving brown lines and interrupted bands; spire minutely longitudinally plicate; base of body-whorl with revolving incised lines. Length, 30 mill.

New Caledonia.

* * *Shell obsoletely or faintly plicate.*

L. NUCLEUS, Lam, Pl. 31, fig. 136.

Flesh-brown, here and there dotted and variegated with chestnut; lip and varices black-dotted. Length, 1–1·25 inches.

N. E. Australia.

The spotted varices which occur occasionally upon this shell indicate the position of former rest-periods in its growth, being the thickened lip, which the animal in resuming growth has failed to absorb away.

L. BEAUI, Fischer and Bernardi. Pl. 31, fig. 137.

Yellowish flesh-color, with revolving chestnut lines, interrupted between the obsolete costæ. Length, 70 mill.

Marie-Galante, West Indies.

A rare species.

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* Jour de Conch., 105, 1866.

L. CASSIDULA, Reeve. Pl. 31, fig. 138.

Cream or flesh-color, clouded with chestnut and white, with interrupted chestnut revolving lines. Length, 1–1·25 inches.

Japan.

L. PUSILLA, Schrenck. Pl. 31, fig. 139.

Yellowish chestnut, with a band of red and white spots at the suture, surface maculated with rufous; aperture yellowish chestnut. Length, 9·5 mill.

Japan.

Described as obsoletely plicate, with two plaits near the base of the columella; neither of these features being very apparent on the enlarged figure of the species. Possibly a young *L. cassidula?* At any rate the specimen appears to be immature, for the description is "labro simplici, recto."

** * * Longitudinal ribs strongly marked.*

L. DELESSERTIANA, Petit. Pl. 31, fig. 140.

Flesh-color with orange-red maculations and bands and chestnut revolving lines. Length, 2–2·25 inches.

Madagascar.

L. LYRÆFORMIS, Swains. Pl. 31, fig. 141.

Flesh-color, with revolving, interrupted chestnut lines, and blotches of the same arranged in three revolving bands.

Length, 3·75 inches.

E. Coast of Africa.

The figure represents a very different looking shell from *L. Delessertiana*, but intermediate forms occur, and I am very doubtful of their distinctness.

L. COSTATA, Swainson. Pl. 31, fig, 142.

Whitish, with orange-red spots and interrupted revolving lines. Length, 2 inches.

Moluccas; Indian Ocean.

L. MITRÆFORMIS, Lam. Pl. 31, fig. 143.

Flesh-color or yellowish, with dark chestnut spots and revolving lines, the latter sometimes broader so as to form interrupted bands. Length, 2 inches.

Australia, Tasmania, Java, S. Africa.

L. costata has a flattened shoulder, upon the angle of which the longitudinal ribs terminate in spines; whilst *L. Mitræformis*

has a shelving shoulder merely obtusely angulated; yet I suspect that the two forms are mere varieties of one species.

L. Archeri, Angas. Pl. 31, fig. 144.

Yellowish, clouded and lined with chestnut; lip punctate with black, dentate within; columella with three strong basal plicæ, and numerous smaller ones above. Length, 1·33 inches.

Montserrat, West Indies.

The form and coloring are very like the preceding species, but the dentate lip is an extraordinary feature which may distinguish it from all others. The type is the only specimen known, and the locality is doubtful. Appears to connect *Lyria* proper with its subgenus *Enæta.*

Subgenus Enæta, H. and A. Adams.

Exterior lip thickened, inflected and bearing an obtuse tooth upon its middle inner margin.

L. harpa, Barnes. Pl. 31, fig. 145.

Pale flesh-color or gray, with chestnut or chocolate angular spots and maculations, frequently forming faint interrupted bands. Length, 1–1·5 inches.

W. Coast of Central America.

L. Cumingii, Brod. Pl. 31, figs. 146, 147.

Pale flesh-color, clouded and lined with chestnut.

Length, 1–1·5 inches.

W. Coast of Central America, northward to San Blas.

L. Cylleniformis, Sowb. (fig. 147), appears to be a small shell of this species.

E. Pedersenii, Verrill.

Shell small, rather slender, elongated; the spire regularly conical, acute, about two-thirds the length of the body-whorl; each whorl much flattened below the suture and encircled by a row of rounded tubercles; the body-whorl with low, rounded, longitudinal costæ below the tubercles. Whole surface finely longitudinally sulcated or striated, on the upper whorls also transversely striated. Color fulvous brown, specked with bluish white, with an interrupted band, or spots, of deep brown below the suture, a pale

band over the tubercles, and another, bordered with brown, below the middle of the body-whorl. Length, 1 inch.

La Paz, Lower California.

Not figured; said to be more slender, with the spire more acute, smaller tubercles and costæ, a more prolonged and recurved siphon, and more contracted aperture than *L. Cumingii*. The surface is not smooth and the color is lighter.

L. GUILDINGII, Sowb. Pl. 31, fig. 148.

Fulvous, with white and darker lines; longitudinally ribbed, granose at the sutures. Length, ·5 inch.

I. St. Vincent, West Indies.

I am not acquainted with the species.

L. GUTTATA, Reeve. Pl. 31, fig. 149.

White, maculated with brown; longitudinally plicate. Length, ·5 inch.

Honduras.

Possibly identical with the last species; if so, it will become a synonym, *Guildingii* having priority of publication.

L. COLUMBELLA, Sowb. Pl. 31, fig. 150.

Small, oblong, smooth, pallid maculated with red; spire acuminate, aperture elongate; lip incurved in the middle; columella very obscurely plicate. Having the form of *Columbella nitida*, and showing rather faint plicæ on the columella.

The above is a copy of Sowerby's description and figure. It is certainly not a *Voluta*, and appears more like a *Marginella*.

Genus MICROVOLUTA, Angas.

The deep siphonal notch, and the toothed projection of the base of the pillar, so characteristic of the Volutes, are absent in this curious little genus.

M. AUSTRALIS, Angas. Pl. 31, figs. 151, 152.

White, or ornamented with two rows of distant irregular chestnut blotches and zigzag lines, Length, 10 mill.

Port Jackson Heads, Australia, 25 fathoms.—Brazier.

Family MITRIDÆ.

The animal has a small, narrow head; tentacles close together at the base; eyes near the base or towards the outer middle of the tentacles; proboscis cylindrical, flexible, very extensible, mantle enclosed; siphon simple at the base; foot small, triangular, usually truncate in front.

Some of the larger species have no operculum, but it is often present, though small and rudimentary, on the foot of the smaller species.

Shell with acute apex, usually well developed spire and plicate columella; for the most part destitute of epidermis, which is very thin, smooth and translucent when present.

Mitra is related on the one hand with *Voluta*, on the other with *Marginella*; it is distinguished from the former by its columellar plaits, of which the largest are posterior whilst in *Voluta* they are anterior, by its form, and the apex, which is never papillary; from *Marginella* it is distinguished by its much longer spire, less polished surface, generally large size and particularly by wanting the thick marginal varix of the lip.

The dentition of the Mitridæ presents several distinct types; so that Troschel and Gill have divided the family upon this character. The group *Cylindra* has the teeth of *Marginella* and is placed near that genus by these authors; the form of the shell also recalls Marginellidæ, and although the preponderance of characters accords with *Mitra*, it may be reasonably considered a connecting link with *Marginella*. *Volutomitra* has been placed in Volutidæ on account of the dentition of *V. Grœnlandica*, the only Arctic species of *Mitra*, but I have preferred to retain it and its congeners in Mitridæ, because we know nothing of the dentition of the numerous tropical species. *Turricula* and *Strigatella* are allied by their dentition to the Olividæ, and *Imbricaria* to the Turbinellidæ.

Mitra has been divided by H. and A. Adams and others into a number of subgenera, whilst Sowerby separates the species into thirteen numbered but unnamed sections. The groups are certainly not entitled to subgeneric rank, yet I believe that the retention of Adams' names for the sections is better than to

designate them merely by numbers. The grouping of the species by these two authorities is in many respects widely different; I have carefully compared them together, and with the shells, and shall attempt to improve upon both.

The Mitras have been monographed by Küster, Kiener, Reeve and Sowerby, the work of the latter being by far the most recent and complete, embracing nearly five hundred species. The "Thesaurus" was published in 1874, and since that date some additional species have been described; there are also a number of species obscurely published or which, for some other cause, appear to have escaped Mr. Sowerby's attention, so that in all the number of specific names which might nominally hold place in the present work would not be far from six hundred and fifty. The vast increase of our knowledge of specific variation developed during the past few years has, however, induced a decidedly more conservative, and it is believed, more philosophic, view of species, than that prevalent only six years ago, so that I have been enabled to effect a vast reduction in the specific ranks—a reduction which will probably become still greater as additional material is given to the student for comparison.

When irritated, some species of Mitra emit a purple fluid having a nauseous odor.

The genus is at present tropical and subtropical in distribution, but few small species being found in the colder latitudes. Bathymetrically they range from low-water to eighty fathoms, the smaller species being usually found along shore-lines.

About a hundred fossil species have been described, commencing with the cretaceous period. *M. Grœnlandica*, at present confined to Arctic waters, is found associated with *M. cornea*, a somewhat similar Mediterranean species in the latest British Tertiaries. The Mitridæ inhabit various stations; many being strictly reef shells, where they lurk in holes and crevices under sea-weed, but are most generally concealed under stones and blocks of dead coral. Others burrow in sand or sandy mud at various depths; some delight in stony ground inside the reefs, where they remain concealed under clumps of coral during the day, and like the sand species are nocturnal in their habits.

Mr. Andrew Garrett* suggests that the Polynesian shells which have been described by H. and A. Adams under the name of *Thala*, as a subgenus of *Mitra*, are more nearly related to Pleurotomidæ, the so-called folds of the columella not being true plaits, but simply more or less irregular transverse rugosities precisely of the same character as those upon certain species of *Clathurella* and *Cithara* of that family. Two species of true Mitræ have, however, been referred to *Thala*, and I have preferred to retain the genus in the Mitridæ for the present, upon duly weighing the value of its known characteristics. Mr. Pease's genus *Mitropsis* is excluded, being a member of the family Columbellidæ. Finally, *Mitromorpha*, A. Ad., appears to be more nearly related to the Pleurotomidæ, several of its species having been described as *Daphnellæ*.

Synopsis of Genera.

MITRA, Lamarck. Shell fusiform, thick; spire elevated; aperture small, narrow, notched in front; columella transversely, somewhat obliquely plicate; outer lip thick, smooth within, not variced externally. Dentition, Pl. 2, figs. 9, 10, 11.

[VOLUTOMITRA, Gray. Separated from *Mitra* on account of the peculiar dentition of an Arctic species, *V. Grœnlandica*. Twenty additional species have been included in the genus by H. and A. Adams; they are all Mitras in appearance, and the dentition of none has been examined except that of *V. cornea*, which decidedly differs from *Grœnlandica*, and is of the regular *Mitra*-type. Dentition of *V. Grœnlandica*. Pl. 2, fig. 8.]

THALA, H. and A. Adams. Small, narrowly fusiform, sculptured or smooth, last whorl attenuated and recurved below; outer lip thickened, straight or incurved in the middle, lirate internally, with a slight sinus at the hind part. Dentition unknown.

[STRIGATELLA, Swainson. Shell ovate or Columbelliform, solid; spire acuminate; whorls smooth or transversely striated, usually covered with an epidermis; inner lip with a callosity at the hind part; outer lip usually thickened in the middle, and internally grooved or dentate. Dentition unknown.]

* Catalogue of the Polynesian Mitridæ, in the (English) Journal of Conchology, iii. A very valuable paper, from which I have drawn largely for these pages.

ZIERLIANA, Gray. Ovate or Columbelliform, solid; spire short, acute. last whorl tumid at the hind part; columella with a posterior callosity; outer lip thick, flattened, lirate-dentate within; a sinus or short canal posteriorly. Dentition. Pl. 2, fig. 12.

MITROIDEA, Pease. Shell mitriform, smooth, spire acuminated; aperture narrow, linear; columella with numerous, small oblique plaits, narrowed and turned to the left at the base; outer lip thickened, peculiarly truncated and recurved at the base. Dentition similar to that of Mitra.—Macdonald.

DIBAPHUS, Philippi. Subcylindrical, covered with a thin epidermis, transversely sculptured; spire acute; aperture narrow, linear; columella without plaits, narrowed and turned to the left at base; outer lip thickened, rectilinear, abruptly truncated and recurved at the base. Dentition unknown. The unarmed columella is the principal and perhaps insufficient distinction for this genus from *Mitroidea*.

TURRICULA, Klein. Shell elongated, turreted. longitudinally plicately ribbed; spire acuminated; aperture narrow; columella with numerous plaits; outer lip internally striated. Dentition, Pl. 2, fig. 13.

CYLINDRA, Schumacher. Shell oliviform, subcylindrical: spire conical; aperture linear; columella straight, with several oblique anterior plaits; outer lip thickened, smooth within. Dentition, Pl. 2, fig. 15.

IMBRICARIA. Schumacher. Shell coniform, often covered with an epidermis; spire depressed conical, apex mucronate; aperture linear; columella straight, with numerous transverse imbricated plaits in the middle; outer lip thickened.

Fossil Genera.

LAPPARIA, Conrad. Uncharacterized.

L. DUMOSA, Conrad. Pl. 3, fig. 43. Eocene, *Jackson, Miss.*

FUSIMITRA, Conrad. Uncharacterized.

F. CELLULIFERA, Conrad. Pl. 3, fig. 40. Oligocene, *Vicksburg, Miss.*

CONOMITRA, Conrad. Uncharacterized.

C. FUSOIDES, Lea. Pl. 3, fig. 41. Eocene, *Claiborne, Ala.*

Genus MITRA, Lam.

The animal of *Mitra* has in general a very short foot, straight and continuous from side to side in some species, but in others notched and produced, with a thickened anterior margin. It is commonly narrow and rounded, or acuminated posteriorly, and it often bears a very small semitransparent horny operculum, in

some instances scarcely visible. The siphon is mostly directed forward, and the somewhat short, tapering tentacles have the eyes either situated about half-way or they are placed on the outer side of the base. The head is long and very flat, and the tentacles are very close together at their bases. The proboscis is rarely exserted when they are crawling and lively, but as they become languid after capture it becomes distended with water and protrudes considerably.

The Philippine Islands would seem to harbor the greatest number of these elegant and beautiful shells, although a great many species were obtained by Mr. Cuming in tropical America. They appear to be chiefly confined to the equatorial regions, scarcely any being natives of cold climates. The transversely ribbed species are frequently found in very deep water, and many have been dredged in twenty and thirty fathoms at Sooloo and in the China Sea.

Although M. Quoy has rightly termed the *Mitra* an "animal apathique," the small longitudinally ribbed species crawl about pretty briskly over the smooth sand among the low coral islands. The *Mitra episcopalis*, probably on account of the small size of its locomotive disk, and the ponderous nature of its long shell, is, however, a very sluggish mollusk. Some of the Auricula-shaped Mitres that live among the Philippines, in the shallow pools left by the receding tide, crawl about the stones out of the water, in company with *Planaxis* and *Quoyia*. The Mitres, like many of the large Volutes, prefer, however, to associate together, and may be seen in dozens crawling over the sandy mud-flats in shallow water, being most active just as the flood-tide makes. When the tide recedes, they bury themselves superficially in the yielding soil, and are with difficulty discovered. Some of the small-ribbed species cover themselves entirely with the sandy mud, and in that disguised condition travel about with comparative security.*

Among the Bashu group, and more particularly on the island of Ibayat, the natives form very elegant and commodious pipes from different species of shells, the columella and septa of the convolutions being broken down, and a short ebony stem

* Arthur Adams, Moll. Voy. Samarang, 26, 27.

inserted into a hole at the apex of the spire. A pipe of this manufacture, in my possession, is formed from the *Mitra papalis*, and I have seen others made out of *Mitra episcopalis* and of *Cerithium* and *Terebra*.*

Typical Group.

Mitriform, thick, spire elevated, apex sharp; mouth rather small and narrow, notched in front; columella obliquely plicate; lip rather thick, smooth within.

* *Edge of lip crenated, whorls generally spirally grooved and punctured.*

M. EPISCOPALIS, Linn. Pl. 32, fig. 1.

White, with somewhat quadrangular bright red spots, arranged in revolving series. Length, 2·5–6 inches.

Ceylon, Philippines, Polynesia.

M. PAPALIS, Linn. Pl. 32, fig. 2.

White, spotted and blotched with deep scarlet in revolving series. Length, 3–4·5 inches.

Kingsmill, Caroline and Paumotu Isles.

Much more rare in Polynesia than *M. episcopalis*, according to Mr. Andrew Garrett.

M. PONTIFICALIS, Lam. Pl. 32, fig. 3.

White, with oblong or square red spots in revolving series. Length, 2–3 inches.

Polynesia.

Animal creamy white, with opaque white dots. Sometimes the shell is encircled with impressed lines, which are deeply punctured at intervals.

M. CARDINALIS, Gmelin. Pl. 32, fig. 4.

Whitish, encircled by rows of chestnut-bay spots. Length, 1·75–2·5 inches.

Ceylon, Polynesia.

Usually found in shallow water inside the reefs. Animal uniform creamy white.

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* Belcher, Narrative of Voy. of Samarang, ii, 448, 1848.

M. LAMARCKII, Deshayes. Pl. 32, fig. 5.

A somewhat narrower shell than *M. cardinalis*, with fewer and larger spots, which are longitudinally oblong.

Length, 2–2·25 inches.

Habitat unknown.

It is possibly a variety of *cardinalis* in which approximate rows of spots have coalesced into larger ones.

M. VERSICOLOR, Martyn. Pl. 32, figs. 6–8.

Yellowish or brownish white, variegated with chestnut-brown blotches and spots, and numerous small white spots edged with brown. Length, 2·25 inches.

Red Sea, Zanzibar, Madagascar, Polynesia.

The surface is usually ornamented with revolving incised lines bearing punctures. Several species have been manufactured out of slight variations of color and form; they can scarcely be designated as varieties. Among these are *M. nebulosa*, Swains. *teste* Reeve (fig. 8); it is more clouded than the type, and without the white spots; *M. nubila*, Gmel., in which the spots become longitudinal, and narrowed into stripes; *M. erronea*, Dohrn, proposed for the shell figured by Kiener as *M. versicolor* (fig. 7); and Reeve's figure of *M. nebulosa* (fig. 8), the true *nebulosa* being, according to Dohrn, figured by Reeve as *M. infecta*, drawn, he says, from the original type of *nebulosa* in the Cumingian Collection. To add to the confusion, Arthur Adams, at an earlier date, decided also that Reeve's *nebulosa* was not that species, and accordingly renamed it *M. propinqua*. Finally, the shell which Sowerby figures as *M. propinqua*, A. Ad., is an entirely distinct species.

M. PROPINQUA, Sowerby. Pl. 33, fig. 11.

White, with faded chocolate bands and longitudinal brown strigations. Length, 2·8 inches.

Habitat unknown.

Figured by Sowerby for *M. propinqua*, A. Adams, but no such species was ever described, Mr. Adams having given that name to Mr. Reeve's *M. nebulosa*, which he considered different from Swainson's. It seems to be a very distinct species.

M. VARIEGATA, Reeve. Pl. 33, figs. 9, 10, 12, 13, 14.

Whitish, clouded with pale chestnut. Length, 1·25–1·75 inches.

Red Sea, Mauritius, Philippines.

The type had an unusually depressed spire, for the species, accompanied by a slight angulation on the superior portion of the body-whorl. I have before me a specimen exhibiting similar divergence from the normal growth, but not quite so marked. In young, fresh specimens the spire is almost clathrate, the sutures especially being closely plicated; when the shell becomes adult, and somewhat worn, this longitudinal sculpture mostly disappears. It is usually a heavier shell, but comes close enough to *M. versicolor* to give rise to doubts of its distinctness; on the other hand it approaches certain species in which the edge of the lip is not crenulate, and as it is a certain fact that this character also is frequently obliterated with age, there is strong probability that eventually several other synonyms will be added, besides those which I herewith subjoin: these are *M. nympha*, Reeve (fig. 12), being the normal growth, *M. Rossiæ*, Reeve (fig. 14), which is a full-grown and somewhat worn specimen, and probably *M. lacunosa*, Reeve (fig. 13). If the latter is the same species, it will have priority over *M. variegata*.

M. SANGUINOLENTA, Lam. Pl. 33, fig. 15.

Shell encircled by punctate impressed striæ. Yellowish red, strigate with chestnut and spotted with white.

Length, 1·25 inches.

Habitat unknown.

This species is known to conchologists only through the type figured by Kiener; Lamarck himself, according to his synonymy, appears to have confounded it with *M. versicolor*.

M. EXIMIA, A. Adams. Pl. 33, figs. 16, 17.

White, clouded with chestnut. Length, 1 inch.

Mauritius, Ceylon.

Said to be somewhat clathrate by the growth-lines. Is very probably only a stunted specimen of *M. variegata*. *M. lacunosa*, Sowb., not Reeve (fig. 17), is a more advanced stage of growth; it is said to come from Ceylon.

M. CÆRULEA, Reeve. Pl. 33, fig. 18.

Whitish, clouded with bluish gray, with a few chestnut spots or strigations arranged in two revolving series, and below the suture besides; orange-brown within the aperture.

Length, 1·5 inches.

Viti Islands.—Garrett.

Highly colored as is this species, its form and sculpture are so like *M. variegata*, that I doubt its distinctness.

M. MAURITIANA, Sowb. Pl. 33, fig. 19.

Cancellated by pitted grooves and longitudinal ridges; white, with two broad bands of interrupted brown spots.

Length, 1·5 inches. *Mauritius.*

M. INCISA, Ad. and Reeve. Pl. 33, figs. 20, 21.

Whitish, variously clouded with purplish brown, sometimes forming two broad bands, variegated sometimes with small brown spots and whitish fine zigzag lines. Length, 22 mill.

China, Andaman Islands.

Sowerby considers *M. Mariæ*, A. Ad. (fig. 21), a synonym, but Mr. E. A. Smith attempts to separate it on account of slight differences of form. I am satisfied that they are identical, and suspect that they are merely the young of a form of *M. variegata.*

M. SERPENTINA, Lam. Pl. 33, fig. 22.

White, indistinctly stained and zoned with orange, longitudinally painted with waved brown lines shadowed with white; aperture yellowish. Length, 1·5–2·25 inches.

Philippines, Polynesia.

M. Deshayes remarks that *M. variegata*, Gmel., having priority of publication, should be used in place of *serpentina;* the latter has, however, become so well established that Reeve has used the former name for another recognized species, and under the circumstances it is better not to be too strenuous for the maintenance of individual rights.

M. MARQUESANA, A. Ad. Pl. 33, fig. 23.

Color of *M. serpentina*, but finer sculpture, and much smaller size. Length, 23 mill.

Marquesas Islands.

Possibly not distinct from *M. serpentina.*

M. Bovei, Kiener. Pl. 33, fig, 24.

Turriculated, coronated with small tubercles, and encircled with close-set punctured striæ. Ashy white, with two broad bands of ashy violet, flaked with numerous small, snow-white spots; brownish within. Length, 2–2·25 inches.

Red Sea.

In young specimens the tubercles are said to be scarcely apparent, and it may be doubted whether *M. cærulea*, Reeve, is not a non-coronate form of the same species, the painting being very similar.

M. puncticulata, Lam. Pl. 33, fig. 25.

Whitish, tessellated with yellow, with two broad, irregular orange bands, upon which are longitudinal chocolate strigations; aperture yellowish within. Whorls coronated, with closely punctured revolving incised lines, crossed by rugose lines of growth. Length, 1·5–1·75 inches.

Philippines.

M. Sophiæ, Crosse. Pl. 33, fig. 26.

Yellowish brown, whorls tuberculated at the angle of the shoulder, with one or two rows of tubercles below it.

Length, 43 mill.

New Caledonia.

The columella has six plications, whilst that of *M. puncticulata* has but four or five.

M. cratitia, A. Ad. Pl. 33, fig. 27.

Pale yellowish white. Length, 1·6 inches.

South Africa

I am not acquainted with this species.

* * *Outer lip not crenulated on its edge, whorls seldom grooved or punctured.*

M. floccata, Reeve. Pl. 34, fig. 29.

Yellowish bay-color, longitudinally flaked with white, lip crenated near its base. Length, 2 inches.

Habitat unknown.

Described from a unique specimen in the late Cumingian cabinet. The lip is said to be crenulated near its base, and possibly finer examples may be crenulated throughout. It is a doubtful species, too close to *M. variegata*, Reeve.

M. CHALYBEIA, Reeve. Pl. 34, fig. 30.

Whorls smooth, grooved towards the base; rudely very finely crenulated next the sutures; longitudinally streaked with white and ashy blue, transversely indistinctly banded, encircled throughout with equidistant reddish brown lines; columella reddish orange, four-plaited. Length, 2 inches.

Habitat unknown.

Only one specimen known, in the Cumingian collection. Probably an individual variation from some well-known type, such as *M. variegata.*

M. LIMATA, Reeve. Pl. 34, fig. 33.

Shell rather thick, polished, transversely grooved throughout, grooves punctured; whitish, encircled by a pale white-flaked band. Length, 1 inch.

Isl. of Bohol, Philippines.

Probably a variety of *M. variegata*, Reeve.

M. GUTTATA, Swainson. Pl. 34, fig. 31.

Yellowish brown, longitudinally mottled with white. Length, 2 inches.

Ceylon.

M. FERGUSONI, Sowb. Pl. 34, fig. 32.

More volute-shaped than any other species; it is smooth, solid, pale fawn, with fine articulated lines and a little cloud of chestnut; spire rather short, obtuse; aperture large, with smooth outer lip. Length, 1·75 inches.

Panama.

I am not acquainted with this species. The authority for the locality is not given.

M. FLORIDA, Gould. Pl. 34, fig. 35.

Whitish, clouded with yellowish brown, with numerous revolving series of small brown spots; pinkish white within the aperture. Length, 1·75 inches.

Dr. Gould's type, received from Dr. Edmund Ravenel, of Charleston, S. C., is said to have come from Florida; another specimen in the Jay Collection has the habitat Philippine Islands. Its characters are intermediate between *Mitra* and *Voluta.* My

figure is from Gould's type, and I can add nothing to the above meagre information concerning this curious form.

M. Desetangsii, Kiener. Pl. 34, fig. 34.

More ventricose and thicker than *M. variegata*, less strongly cancellated on the upper portion of the two last whorls; with three zones of spots upon the last whorl, one of them sutural, and the other two separated by a wide very light reddish-brown band. Length, 29 mill.

Mauritius.

Kiener's description and my figure (copied) are from a dead and bleached specimen. Liénard gives the above particulars of coloration, and acknowledges its close relationship to *M. variegata* —from which, nevertheless he distinguishes it.

M. cancellata, Kiener. Pl. 34, fig. 36.

Whitish, cancellated and pitted. Length, 1·3 inches.

Habitat unknown.

This shell has been overlooked by subsequent monographers; I can make nothing out of it; it is evidently in bad condition, and only a single specimen is known, in the Massena Collection. There is a *M. cancellata*, Swainson, a very different species.

M. Hamillei, Petit. Pl. 34, fig. 37.

Brown, marbled and tinted with chestnut and olivaceous, finely cancellated by revolving incised lines and close growth-lines. Length, 1·5 inches.

Cape Verd Islands.

Distinguished by its compressed cylindrical form. A species from Moreton Bay sent to the Philadelphia Academy as *M. cylindrica*, Reeve, by Dr. J. C. Cox, of Sydney, N. S. W., appears to be identical with the above.

M. Senegalensis, Reeve. Pl. 34, fig. 38.

Livid olive, longitudinally ornamented with a very few white flames; aperture livid chestnut. Length, 1·3 inches.

Senegal.

M. glabra, Swainson. Pl. 34, fig. 42.

Smooth, polished, with slight incised revolving lines; base truncated and a little recurved. Orange-red, encircled by fine

brown, hair-like lines; deep orange within the aperture; epidermis smooth, blackish, seldom present upon cabinet specimens. Length, 2–4 inches.

So. and W. Australia.

Specimens are not usually over two inches in length. *M. buccinata*, Quoy, described ten years later, is identical.

M. DECLIVIS, Reeve. Pl. 34, figs. 39, 41.

Whorls smooth, with very faintly impressed revolving lines, angularly bent around the upper part; ashy flesh to orange-color. Length, 2 inches.

Australia.

The locality is given by Sowerby; it was unknown to Reeve, whose specimen was in the Norris Collection. The epidermis is said to be very black, and there is no trace of the brown revolving lines of *M. glabra;* still I strongly suspect that this will prove to be a deformed specimen of that species.

M. FULGURITA, Reeve. Pl. 34, fig. 43.

Revolving striæ closely punctured; yellowish bay, slightly banded with pale longitudinal streaks. Length, 2 inches.

Habitat unknown.

A common enough but characteristic species, of which excellent specimens are before me.

M INQUINATA, Reeve. Pl. 34, figs. 40, 44.

Whorls encircled by distant, punctate, impressed lines; whitish, tessellated longitudinally with chestnut-brown, sometimes broken up into quadrangular spots by the revolving sculpture. Length, 2–3 inches.

Japan (M. Wrighti).

Described from a single specimen without locality. It is difficult to point out distinctive characters from the last species, and I suspect that they are identical; *M. Wrighti*, Crosse (fig. 44), is evidently the same species as *inquinata*.

M. BARBADENSIS, Gmelin. Pl. 35, figs. 45, 46, 48, 49.

Yellowish brown, polished, sometimes faintly, narrowly zoned with chestnut, flaked here and there with white.

Length, 1–1·75 inches.

West Indies, on coral reefs.

M. tessellata, Kiener (fig. 48), is a short shell of this species,

and *M. picta*, Reeve (fig. 49), is also a synonym; Sowerby erroneously refers the latter to the Cape of Good Hope.

M. SIMPLEX, Dunker. Pl. 35, fig. 50.

Smooth, slightly striate at base; chestnut, sometimes sparsely flecked with white. Length, 9 mill.

Cape of Good Hope.

Much smaller and broader than *M. Barbadensis*, which it appears to resemble.

M. VARIABILIS, Reeve. Pl. 35, figs. 47, 56.

Yellowish brown, sometimes narrowly lined with chestnut, tessellated with white around the suture and periphery, the latter sometimes confluent into an irregular broad white band; yellowish brown within the aperture. Length, 1·5–1·75 inches.

Torres Straits, Australia.

Fig. 56 represents Reeve's *M. cylindracea.*

M. RUBIGINOSA, Reeve. Pl. 35, fig. 54.

White, with large spots or tessellations of yellowish brown; closely punctured in revolving lines. Length, 28–40 mill.

Isl. Ticao, Philippines.

M. CANCELLATA, Swainson. Pl. 35, fig. 55.

Sutures crenulated, whorls cancellated by revolving impressed lines and longitudinal raised striæ. Light yellowish brown, longitudinally streaked with white, with three rather indistinct bands of interrupted orange spots. Length, 1·75 inches.

Habitat unknown.

Described from a unique Cumingian specimen.

M. USTULATA, Reeve. Pl. 35, fig. 51.

Whitish, maculated with chestnut so as to form interrupted bands. Length, 1–1·7 inches.

Viti Islands.—Garrett.

M. IGNOBILIS, Reeve. Pl. 35, fig. 52.

Whitish, with interrupted bands of chestnut spots.

Length, 1·5 inches.

Philippines.

Broader than *M. ustulata*, the revolving sculpture more distinct.

M. CONTRACTA, Swainson. Pl. 35, fig. 53.

Yellowish white, clouded with chestnut, engraved with revolving striæ. Length, 1–1·5 inches.

Red Sea; Philippines; Polynesia.

The peculiar form of this species will at once distinguish it from its neighbors. It is narrower and without the elevated ridges of *M. chrysostoma*, and approaches the genus *Mitroidea* in shape. It has been usually known as *M. abbatis*, Chemn., but he was not a binomial author, so that I have preferred Swainson's later name.

M. LATRUNCULARIA, Reeve. Pl. 35, fig. 59.

Whitish, obscurely banded, and tessellated with chestnut. Length, 1–1·25 inches.

Cape of Good Hope (Sowerby); *Viti Isles* (Garrett).

M. SOLIDA, Reeve. Pl. 35, fig. 57.

Fulvous bay-color, with irregular white spots in a series upon the periphery, and another at the suture. Length, 1·8 inches.

Australia.

M. PIGRA, A. Ad. Pl. 35, figs. 58, 60.

Olive-brown, tessellated with white around the suture; aperture brown within. Length, 1·5 inches.

Australia.

M. CALIGINOSA, Reeve. Pl. 35, fig. 61.

Whitish, covered with a black epidermis. Length, 1·4 inches.

Habitat unknown.

M. SACERDOTALIS, A. Ad. Pl. 35, fig. 62.

Chestnut-brown, with a light band at the suture and another on the periphery, and longitudinal dark chestnut streaks. Length, 3 inches.

Australia.

M. CHINENSIS, Gray. Pl. 36, figs. 65, 66.

Pale brown under a brownish black, smooth epidermis; upper whorls and base of body-whorl with revolving striæ. Length, 2·25–3·5 inches.

China.

Sowerby's figure of this species (fig. 65) is much larger than the type, and differs in having some obscure darker longitudinal streaks and a light sutural line; it is not very different from *M sacerdotalis*. *M. obliqua*, Lesson, an unfigured species, is com-

pared by him with *Chinensis;* its distinctive characters do not appear to be important.

M. STRIGATA, Swainson. Pl. 35, fig. 63.

Smooth, reddish brown, with lighter longitudinal streaks. Length, 2 inches.

Habitat unknown.

M. ROSETTÆ, Angas. Pl. 35, fig. 64.

Deep orange-brown, longitudinally strigate with white; with distant impressed revolving striæ. Length, 1·25 inches.

So. Australia.

The whorls are flatter than in the preceding species—with which nevertheless it may be synonymous.

M. SWAINSONI, Brod. Pl. 36, fig. 68.

Turreted, with rather deep sutures, smooth, striated towards the base; brownish or dirty white covered with a blackish brown epidermis. Length, 3·4–3·6 inches.

Monte Christi, W. Columbia; sandy mud, 7 fathoms.

Much larger than the next species, but may prove to be identical with it; the shoulder of the whorls, amounting to a deformity, is exactly imitated in specimens of *M. maura* before me.

M. MAURA, Swainson. Pl. 36, fig. 67.

Dirty white or brown, with revolving striæ; covered by a smooth black or blackish brown epidermis; aperture light chocolate. Length, 1–2·25 inches.

Peru, northwards to San Diego, Cal.

This species attains its maximum development upon the Peruvian Coast, where it is plentiful, in fissures of rocks at low water; it is much smaller in the waters of California. Gray's name, *M. orientalis*, has priority, but is not adopted because geographically misleading. It is the *M. Chilensis* of Kiener. According to d'Orbigny the animal has a narrow foot, is pure white, with black eyes.

M. INDUTA, Sowb. Pl. 36, fig. 70.

Very obscurely striated, but strongly grooved towards the base; outer lip thin, arched, very minutely crenulated, smooth within; epidermis blackish brown. Length, 33 mill.

Habitat unknown.

A doubtful species; apparently founded on a single specimen.

M. QUOYI, Desh. Pl. 36, fig. 71.

Shell smooth, with faint impressed revolving striæ; epidermis black. Length, 20 mill.

New Ireland.

This species, described and figured by Quoy under the name of *M. nigra*, is very different from the previously described *M. nigra* of Chemnitz, and is scarcely equivalent to that figured by Reeve; it is, then, an unidentified species. I give a copy of one of the original figures.

M. ABBREVIATA, Sowb. Pl. 36, fig. 69.

Smooth, faintly striate at base; epidermis black.
Length, 28 mill.

New Zealand.

Name proposed for *M. nigra*, Reeve (not Chemn. nor Quoy).

M. NITIDA, A. Ad. Pl. 36, fig. 73.

Smooth, chocolate-brown, with a few impressed revolving lines. Length, ·5 inch.

Habitat unknown.

Probably a worn, juvenile specimen.

M. INFRAFASCIATA, Souverbie. Pl. 36, fig. 72.

Smooth, slightly striate near the base; brownish black, with a yellowish band on the periphery, visible within the brown aperture. Length, 8–9 mill.

New Caledonia.

Two specimens obtained.

M. FUSCA, Swainson. Pl. 36, fig. 75.

Smooth, very finely striated with punctures near the apex; slightly striate at the base, body-whorl slightly contracted in the middle; epidermis very dark brown, sometimes lighter beneath the sutures. Length, 1–1·75 inches.

Madeira, Atlantic Coast of Portugal and So. France.

M. Adansonii, Phil., described as from Gabon, in Guinea, W. Africa, appears to agree fairly with this species; it has not been figured nor alluded to by the monographers.

M. CORNICULA, Linn. Pl. 36, figs. 74, 76–81.

Horny brown; smooth, impressed striæ at the base.
Length, 1–1·25 inches.

Mediterranean Sea; Atlantic Coast of N. Africa.

Considerable confusion exists in the nomenclature of this species, the names of *cornicula* and *cornea* having been rather loosely applied by different authors; several of the most recent investigators have applied to it that of *M. lutescens*, Lam., as a name about which there can be no doubt; I agree with Deshayes, Reeve, etc., that the name given by Linnæus may be fitly preserved for the species. The form and coloration are certainly variable—how variable, I am not able to determine. The following, among the large number of synonyms, have been variously separated as varieties and even as species, and there are not wanting connecting forms even with so typically diverse a species as *M. ebenus*.

M. Philippiana, Forbes (fig. 77), is considered by Weinkauff a minor form of var. *cornea*, Lam.; it appears to me to be merely a young shell without distinctive features. A curious color-variety is that figured by Kiener as *M. cornicularis*, Lam. (fig. 76). *M. graja*, Reeve (fig. 78), is from the Isle of Paros, Grecian Archipelago; it is a solid shell and appears to connect with

Var. LACTEA, Lam. (fig. 79).

Shell smooth, solid, white; with fine revolving striæ.

Var. PLUMBEA, Reeve (fig. 80).

Mitra plumbea, Lam., is usually referred to the smooth form of *M. ebenus*, Linn., but the shell which Reeve and Sowerby have figured for *plumbea* is very different from that species. It is nearer to *cornicula*, but may be entirely distinct, being a larger, stouter shell, chestnut-brown covered partially by a plum-like bloom.

Var. SCHRŒTERI, Desh. (fig. 81).

Pale horny brown, marked with white next the sutures and with an irregular central light band. Length, 1–1·25 inches.

Weinkauff* thinks this a West Indian species, but no such form is known there. Deshayes considers it fully equivalent to *M. cornicularis*, Lam. It connects closely with *M. Kieneri*, Sowb.

* Bull. Mal. Ital., iii, 75.

M. INSOLATA, Sowb. Pl. 36, fig. 82.

More pyramidal, and the whorls not gibbous at the suture as in *M. lactea* (= *lutescens*, var.), White. Length, 1·1 inches.

Habitat unknown.

An unsatisfactory species.

M. PETROSA, Sowb. Pl. 37, fig. 99.

Thick, white, with slight revolving striæ. Length, 1·5 inches.

Habitat unknown.

Described from a single specimen in the late Taylor Collection.

M. KIENERI, Sowb. Pl. 36, fig. 86.

Plum-color, mottled or streaked with dark chestnut, with a narrow white band above the periphery, and visible on the spire. Length, 1·25 inches.

Sowerby describes and figures this from a shell which he says agrees with Kiener's illustration of *M. ebenus*, and from which species it is perfectly distinct. It appears to me to hold about the same relation to *M. ebenus* that *Schrœteri* does to *cornicula*, and to be as closely related also to *Schrœteri;* in fact, it seems to be a connecting form between *cornicula* and *ebenus.*

M. GRŒNLANDICA, Gray. Pl. 36, fig. 83.

Whitish, under a corneous epidermis. Length, ·5–·85 inch.

Greenland.

This is the type of the genus *Volutomitra*, Gray, separated from *Mitra* on account of possessing an entirely different lingual dentition. If it be recognized as a distinct genus on this account, it must stand alone, as the twenty species referred to the genus by H. and A. Adams are indistinguishable from *Mitra* by the shell, and their dentition is entirely unknown.

M. EBENUS, Lam. Pl. 36, figs. 84, 85, 87, 88; Pl. 37, figs. 89, 90.

Smooth, shining, chocolate-brown; with a narrow yellowish line upon the upper part of the body-whorl, visible on the spire. Length, ·75–1 inch.

Mediterranean Sea; North Atlantic Coast of Africa.

Var. COSTATA has the shell wrinkled longitudinally, a well-marked example being *M. Defrancii*, Payr. (fig. 88); all intermediate stages occur to the smooth form.

Among the synonyms are *M. cornicularis*, Costa, not Lam.; *M. cornicula*, Risso, not Linn.; *M. plumbea*, Lam., not Reeve or Sowb., and *M. plicatula* and *pyramidella*, Brocchi—two fossil forms.

M. livida, Reeve (fig. 89), habitat unknown, and *M. chelonia*, Reeve (fig. 90), said to come from the Island of Burias, Philippines, are both referred to *M. ebenus* by Sowerby.

M. PATULA, Reeve. Pl. 37, fig. 91.

Light corneous, sometimes with a narrow, superior white band; surface slightly folded longitudinally, or nearly smooth.

Length, ·5 inch.

Cape of Good Hope.

M. WELDII, Tenison-Woods.

Banded orange and dark brown; translucent, with faint ribs on the upper whorls. Length, 10 mill.

Tasmania.

This species has not been figured, and I know nothing concerning it.

M. CAPENSIS, Dunker. Pl. 37, figs. 95, 92, 94.

Yellowish or orange-brown, banded with chocolate on the periphery, sometimes with a second band beneath the suture and chocolate-tinged at the base.

Length, ·6 inch.

Natal, South Africa.

M. vincta (fig. 94), and *M. rufocincta* (fig. 92), of A. Adams, appear to be synonymous.

M. PICA, Reeve. Pl. 37, fig. 96.

Smooth, dark chocolate, tinged with white below the sutures and at the base. Length, ·7 inch.

Cape of Good Hope.

M. LACHRYMA, Reeve. Pl. 37, fig. 93.

Thin, whorls finely longitudinally ribbed at the upper part, crossed by revolving obsolete raised striæ; white, with an orange-brown blotch at the back.

Habitat unknown.

The several foregoing species, from the Cape of Good Hope and its vicinity, are all known only from the figured types. *M. lachryma* may well be identical with *M. pica*.

M. FUNEREA, Reeve. Pl. 37, figs. 100–103.

Spire-whorls well rounded, closely longitudinally sculptured, decussated by revolving lines; upper portion of body-whorl similarly sculptured, middle smooth or nearly so, base with close revolving striæ. Chocolate-brown, with a narrow yellow band below the shoulder of the whorl. Length, 1–1·25 inches.

Isle of Luzon, Philippines; six fathoms, sandy mud.

Possibly *M. chelonia*, Reeve (fig. 90), referred to *M. ebenus*, may be a smooth variety of this species. That it varies considerably is shown by Sowerby's figure of it (fig. 101). *M. bilineata*, Reeve (fig. 102), and *M. analogica*, Reeve, not Sowerby (fig. 103), both appear to be younger individuals of this species.

M. AUSTRALIS, Swainson. Pl. 37, figs. 104, 105.

Smooth, polished; brown, with a broad yellowish band stained with chestnut. Length, 1·25 inches.

Van Dieman's Land; Australia.

This shell approaches very closely to *M. Kieneri*, Sowb. If Quoy's *M. melaleuca* (fig. 105) is a synonym, as decided by Reeve and Sowerby, then it must be the normal form of the species, and *Australis* a stunted, scalariform monstrosity of it.

M. LAMBERTI, Souverbie. Pl. 37, fig. 106.

Whorls encircled by punctate, impressed striæ; chestnut-brown, with a narrow yellowish band on the upper part.

Length, 1 inch.

New Caledonia.

M. POLITA, Reeve. Pl. 37, fig. 107.

Upper part of the spire longitudinally plicate, body-whorl with revolving striæ at base, otherwise smooth and polished; chestnut or ashy brown, with a narrow light band.

Length, 1·25–1·75 inches.

Philippines, Ceylon.

M. CALLOSA, Reeve. Pl. 37, fig. 108.

Smooth, striate towards the base; leaden brown, variegated, spotted or obscurely banded with brown. Length, 1·1 inches.

Philippines.

Looks like a "telescoped" condition of *M. polita*, described above.

M. EFFUSA, Swainson. Pl. 37, fig. 109.

Uniform dark chestnut, encircled with fine raised ridges.

Length, 1·25 inches.

Guacomayo, Central America; Gallapagos Is.

M. TESTACEA, Swainson. Pl. 37, figs. 110–112.

Chestnut-brown, with obsolete or deep-cut revolving lines at the base. Length, 1·25 inches.

Kingsmill, Cook's, Society and Paumotus Is.

That *M. Bulimoides*, Reeve (fig. 111), and *M. badia*, Reeve (fig. 112), are both synonyms, I have little doubt; they are described without locality.

M. RHODIA, Reeve. Pl. 37, fig. 114.

Smooth, polished, with very fine, obsolete spiral striæ, becoming more distinct towards the base; dark olive or chestnut-brown. Length, 1 inch.

Port Jackson Austra

Habitat unknown.

More narrowly acuminated than the preceding species; of which nevertheless it may be a variety.

M. CASTANEA, A. Ad. Pl. 37, fig. 115.

Chestnut-color; transversely punctate-striate. Length, ·9 inch.

Habitat unknown.

"This species most nearly resembles *M. badia*, Reeve, but the whorls are rounded, and it differs in other particulars." The white spots on Sowerby's figure (the only illustration of the species) are not described:—do they represent punctations?

M. MELANIANA, Lam. Pl. 37, figs. 118, 119.

Dark olive-brown, or dark chestnut, smooth and polished, usually with small white spots below the suture.

Length, 2–2·5 inches.

Port Jackson, Australia.

Sowerby and Reeve call this species *M. nigra*, Chemn., but the figures in that scarcely quotable author do not indicate this shell. Reeve gives Isl. of Annaa, Pacific Ocean, as locality, and Lamarck quotes Guinea, India and Greenland!—all errors. Something like *M. Chinensis*, Gray, but differs in its more flattened whorls. *M. digna*, A. Ad. (fig. 119), is synonymous.

M. SCITA, Tenison-Woods.

Shell small, ovate, shining, entirely pure deep brown; spire obtusely rounded, apex mamillated, whorls six, smooth, tumid, suture finely impressed; aperture rather wide, brown within, lirate, columella triplicate. Length, 8 mill.

Tasmania.

Very distinct from its size, and intense uniform coloring, though belonging to the series of which *M. badia* (= *testacea*) is a large representative. The above is the original description; not figured.

M. TERESIÆ, Tenison-Woods.

Shell oblong-ovate, somewhat thin, shiny, subventricose, brown, with two whitish bands; spire somewhat short, scarcely acute, whorls five, smooth, tumid, shining conspicuously, finely canaliculate at the suture, aperture ovate, bifasciate within, columella triplicate. Length, 7–14 mill.

Tasmania.

The coloring seems very persistent, and therefore the species is not easily mistaken. I confess, however, that if this species could lose the white bands, and were to have the mouth lirate within, I should regard it as a variety of *M. scita*. I think the liræ are not persistent in the latter, and therefore the shell may be the same. The above is the original description; unfigured.

M. TYPHA, Reeve. Pl. 37, figs. 113, 116.

Encircled by fine striæ; horny, transparent, with a broad, rusty brown band. Length, ·6 inch.

Viti Isles; I. of Bohol, Philippines, under stones at low water.

M. peculiaris, Reeve (fig. 116), appears to be a shouldered monstrosity of this species.

M. FLEXILABRIS, Sowb. Pl. 37, fig. 98.

Smooth, with faint spiral striæ; yellow, with two orange-brown bands. Length, 13 mill.

Mauritius.

More cylindrical and narrower than *M. typha*, Reeve, and differently banded, yet I doubt its distinctness from that species.

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M. TENUIS, Sowb. Pl. 37, fig. 117.

Transparent, horny, with a light fulvous band on the upper part of the whorls. Length, ·65 inch.

Habitat unknown.

"Much like *M. typha*, but more pyramidal." I suspect that it is not distinct from that species.

M. MICANS, Reeve. Pl. 37, fig. 120.

Smooth, polished, ivory-white, faintly orange-banded. Length, ·7 inch.

Cook's Islands, Polynesia.—Garrett.

Perhaps this also is a form of *M. typha*.

M. COOKII, Hanley. Pl. 37, fig. 121.

Chestnut-brown, variegated with blue-gray; delicately striated. Length, 1·25 inches.

Australia.

I do not know this species.

M. ALBINA, A. Adams. Pl. 37, fig. 97.

Spire and upper part of body-whorl folded longitudinally; white. Length, 1·1 inches.

Island of Luzon, on the reefs.

Described from a single specimen in the Cumingian Collection.

Section **Aidone**, H. and A. Adams.

Shell fusiform, smooth, polished, small; spire acuminate, as long as the aperture; inner lip excavated, with two prominent plaits in the middle; outer lip thin, simple.

This little *Olivella*-like form may prove to be generically distinct from *Mitra*.

M. ALBA, Pease. Pl. 51, fig. 471.

White, polished, finely striated. Length, 7·5 mill.

Society and Paumotus Islands.

Mr. Pease describes the columella as quadriplicate, but his specimens now before me have only two distinct plicæ, although there are slight indications of additional ones, as might be expected.

M. INSIGNIS, A. Ad.

An unfigured species, referred to *Aidone*, as its type. It comes from Rains' Island.

Section **Swainsonia**, H. and A. Ad.

Oliviform, smooth, polished, spire nearly as long as the aperture.

M. ZONATA, Marryatt. Pl. 38, figs. 122, 126.

Yellowish brown, the lower half of the body-whorl chocolate-brown, forming a narrow band on the spire. Length, 2·5 inches.

Mediterranean; deep water, in rocky places.

Petit, writing in 1869, says: "Cette coquille est le rêve et en même temps le désespoir de l'amateur. Elle n'a été trouvée, dit-on, que deux fois." It has since become more common, and although one of the rare species, all doubt as to its being really an inhabitant of the Mediterranean Sea, has finally been dissipated. It has been found at Toulon, on the North African Coast, near Catania, in the Gulf of Naples, Leghorn, Sardinia, etc. *M. Sant-angeli*, Maravigna (fig. 126), is founded on a worn example in which the colors have faded to white and orange.

M. CASTA, Lam. Pl. 38, fig. 123.

Ivory-white, covered, except a narrow band at the suture and another wider one at the base, by a persistent smooth, thin chestnut- or olive-brown epidermis. Length, 1·25–2 inches.

Zanzibar; Mauritius; Polynesia, in sandy mud, laminarian zone.

Cabinet specimens usually preserve the epidermis, but when specimens are weathered, they become uniformly polished white. Mr. Sowerby makes *M. lævis*, A. Ad., an unfigured species, a synonym. I have preferred quoting Lamarck for this species rather than Chemnitz or Solander, who used the name, less definitely, at an earlier date. *M. bicolor*, Swainson, is the young shell of this species.

M. FILUM, Wood. Pl. 38, fig. 127.

White, with a very broad chestnut or olive-brown band, which is finely streaked across with white, apex and base black tipped. Length, ·85 inch.

Zanzibar.

Kiener and Deshayes have erroneously identified with this species *M. bicolor*, Swains., which is really the young of *M. casta*. *M. affinis*, Lesson, an unfigured species from the Gambier Islands, may be identical with it.

M. Olivæformis, Swainson. Pl. 38, fig. 131; Pl. 33, fig. 28.

Whorls encircled by punctate incised lines, which are usually obsolete except around the upper part; yellowish or orange, apex and base dark blue-black. Length, ·65 inch.

Society Islands, gregarious, in sand inside the reefs.

M. dactyloidea, Anton (fig. 28), appears to be a young shell of this species.

M. formosa, Pease. Pl. 38, fig. 128.

Smooth, polished, transversely regularly punctate-striate; light flesh-color, spotted or striped longitudinally with white, aperture yellowish. Length, 14 mill.

Ascension Isl.

Allied to *M. filum*, Wood.

M. Newcombii, Pease.

Shell elongate, rather cylindrically fusiform; spire short, acute; whorls flatly convex, transversely punctate-striate, striæ becoming sometimes obsolete on middle of last whorl; spire and upper part of last whorl decussated by longitudinal impressed striæ; base distantly grooved and somewhat truncate; columella five-plaited, white, remotely punctured with reddish brown dots, last whorl encircled with a broad dark brown band.

Length 27, diam. 8 mill.

Sandwich Isles.

Allied to *M. filum*, Wood, but somewhat larger. It is unfigured, and I have not seen a specimen, but I suspect that it is a variety of that species.

M. fissurata, Lam. Pl. 38, figs. 124, 125.

Smooth, polished, sometimes partly or wholly encircled with distant, slightly impressed revolving lines; pale pink-gray, with a broad obscure darker band, overlaid with a china-crackle pattern of white lines; sometimes the band is bordered above by brown ocelli, visible above the suture-line of the spire; livid within the aperture. Length, 1–2 inches.

Red Sea; Mauritius; Zanzibar.

M. ocellata, Swainson (fig. 125), is the shell with the dark spots; it is not a distinct variety as these may be detected obscurely marked on most specimens, and occasionally become more or less prominent.

M. ZEPHYRINA, Duclos. Pl. 38, figs. 129, 130.

Cylindrical oliviform, with distant, slightly impressed revolving lines; chestnut-brown, sometimes flecked with white in two spiral series. Length, ·75–1 inch.

Mauritius.

The variety without spots has been called *M. Nevilli* by Mr. Hanley (fig. 130).

M. EBURNEA, Philippi. Unfigured. *Marquesas Islands.*

Not included in the monographies, and unknown to me.

Section **Scabricola**, Swainson.

Mitre-shaped or pyramidal; granulated or scabrous.

M. TESSELLATA, Martyn. Pl. 38, figs. 139, 136.

Pale yellow, with chestnut-brown longitudinal flames. Length, 2·5–3·5 inches.

Polynesia; Zanzibar?

The longitudinal plications sometimes become obsolete, on which state *M. terebralis*, Lam. (fig. 136), is founded. It is doubtful whether the latter form comes from Zanzibar; at any rate, I have before me examples of it from the Paumotus Islands. Garrett says that the animal is cream-yellow; the small triangular foot is reddish brown above, and the siphon is varied with a lighter shade of the same color. Philippi contends that Lamarck's species *terebralis* is different from the figure bearing that name in Reeve, and so calls the latter *M. Reevei;* but Deshayes, in Lamarck, refers to Kiener's figure, which is the same as that of Reeve and Sowerby.

M. IMPRESSA, Anton. Pl. 38, fig. 132.

Yellowish or orange-brown; sometimes slightly shouldered. Length, 1–1·25 inches.

Japan.

So closely is this related to the *M. granulosa*, that, were it not for the difference in locality, I would be disposed to consider it a variety.

M. VITELLINA, Gould. Pl. 38, fig. 134.

Pale orange, with an imperfect white vitta adjacent to the posterior revolving striæ, a second at the anterior third of the

last whorl, and with the other parts of the shell slightly mottled with white, except the sutural portion. Length, 1·75 inches.

Hab. uncertain; probably East Indies.

Narrower than *M. impressa*, of which, nevertheless, it may be only a variety.

M. GRANULOSA, Lam. Pl. 38, fig. 138.

Orange, or sometimes chestnut-brown; occasionally obscurely banded, or with the granules next the suture lighter colored. Length, 1–1·5 inches.

West Indies; on rocks.

M. ONISCINA, Lam. Pl. 38, fig. 135.

Chocolate-brown, with a superior white band, and an inferior one less distinct. Length, ·6–1·2 inches.

East Indies.

An obscure species figured by Kiener, and not recognized by subsequent naturalists.

M. LENS, Wood. Pl. 38, figs. 133, 137; Pl. 39, figs. 140–142, 144.

Ashy violet or brownish white, covered with a dark epidermis, varying from chocolate to nearly black. Length, 2–2·5 inches.

Peru; Panama; Mazatlan; Galapagos Is.

The dark color and very coarse, rude sculpture of this species will readily distinguish it from all others; there is, besides, on well-grown specimens, two rows of very deep punctures, encircling the middle of the whorls. The Peruvian locality is on the authority of d'Orbigny, who has described a young shell as *M. inca* (fig. 140). *M. Dupontii*, Kiener (fig. 137), is said to come from the Red Sea, but I agree with Reeve and Sowerby that it is a synonym of *M. lens*, and the habitat is *very* doubtful. *M. lignaria*, Reeve (fig. 141), dredged at fourteen fathoms from rocky ground, at St. Elena, W. Columbia, is merely a lighter colored variety, somewhat narrower than the usual form. *M. rupicola*, Reeve (fig. 144), obtained with the last, and unique in the Cumingian Collection, is a *M. lens*, more shouldered than usual; I have before me shells somewhat like it. *M. muricata*, Swainson (fig. 142), cannot be distinguished from a very usual form of young specimens of *M. lens;* Cuming obtained it at the Galapagos Isles, from sandy mud, at six fathoms.

M. VULTUOSA, Reeve. Pl. 39, fig. 143.

Orange-brown. Length, 1 inch.

Isl. of Capul, Philippines (found on the reefs).

Closely allied to *M. impressa*, Anton.

M. NUCLEOLA, Lam. Pl. 39, figs. 145–147, 151.

Fulvous yellow, Length, ·75–1 inch.

Habitat unknown.

The figures given by Kiener (fig. 145), Reeve (fig. 146), and Sowerby (fig. 147) for this shell, are so different that they seem to represent distinct species. The first, which is presumably from the type, if well drawn, has but little affinity with the present group; *M. unifascialis*, Lam., as figured by Kiener (fig. 151), certainly appears to be synonymous with it.

M. SPHÆRULATA, Martyn. Pl. 39, fig. 149.

Whitish, yellowish or light brown, variously stained with dark chocolate or blackish spots on the granules; aperture orange.

Length, 2–2·5 inches.

Philippines; Polynesia.

M. EBURNOSTOMA, Garrett.

Creamy white, sparingly mottled with brown. The sculpture is almost precisely the same as in *M. sphærulata*, but it may be at once distinguished from that species by its paler color, more slender form and pure white aperture.

Length 41, diam. 13 mill.

Paumotus Isles.

A very rare species, of which two examples were found buried in sand in the upper region of the laminarian zone. Its distinctness from *M. sphærulata* may well be doubted; it has not been figured.

M. TEXTURATA, Lam. Pl. 39, figs. 150, 148.

Shell variegated with white and rusty brown.

Length, 1·25–1·5 inches.

Philippines, Viti Isles.

Var. LIFOUANA, Crosse. Fig. 148.

Distinguished from the type by its small size, stumpy form, and uniform white coloring. Length, 16 mill.

Lifou, Loyalty Isles.

M. SUCCINCTA, Swainson. *Habitat unknown.*
M. SUBTEXTURATA, Garrett. *Society Islands.*

Unfigured species, said to be allied to *M. texturata.*

M. CRENIFERA, Lam. Pl. 39, figs. 152, 164, 165.

Yellowish or pinkish white, with two irregular clouded bands of chestnut or chocolate color, or sometimes irregularly maculate; the whole surface is closely decussated. Length, 2 inches.

Mauritius, Manilla, Red Sea, Indian Ocean.

This species is so well-known under its present name that it would be injudicious to revive for it the previously given name of *M. clathrus*, Gmelin. *M. pretiosa*, Reeve (fig. 164), is a young shell of this species; *M. Antoniæ*, H. Adams (fig. 165), is synonymous with it.

M. SCABRIUSCULA, Linn. Pl. 39, fig. 158.

Whitish, clouded with chestnut or chocolate-brown, often appearing like interrupted spiral series on the revolving ridges. Length, 2–2·5 inches.

Philippines; Viti Islands, sandy stations.

A stouter species than *M. crenifera*, the prominent spiral ridges alternating with impressed striæ, the longitudinal sculpture subordinate. The animal is diluted white, maculated with numerous small opaque white spots.

M. HELVACEA, Phil.

An unfigured species, from China, said to be intermediate between *M. scabriuscula* and *M. Isabellina.* Sowerby does not allude to it, although published twenty years before the appearance of his monograph, and I suppose it may be considered a lost species. So much allowance must be made for the personal equation in descriptive and distinctive characters that in these days of minute distinctions it is rarely worth while to attempt to identify unfigured shells, or to reproduce the descriptions for the confounding of students. In nine cases out of ten a description *cannot* be made sufficiently accurate to identify a species positively, and in ninety-nine cases out of a hundred it is sufficiently indefinite to secure a wrong identification from those who attempt to fit it to their unnamed species. Conchologists have suffered more than enough in endeavoring to acquiesce in the cheaply bought glorification of naturalists; it is full time to inaugurate a reform

by ignoring all unfigured species. As my purpose, distinctly stated at the outstart, is to include in my monographs all published species, I shall, at least mention them all; although I have been frequently disposed, as in the present case, to allow them to remain in the oblivion into which they had sunk, rather than bring them again to the notice of science.

M. PUNCTOLIRATA, A. Ad.

Described as a *Scabricola*. Unfigured. From *Gotto Is., Japan.*

M. EHRENBERGI, Jickeli. Pl. 39, fig. 153.

Whitish, with two pale rosy bands, appearing within the aperture. Length, 24 mill.

Red Sea.

Described from a single specimen.

M. HEMPRICHII, Jickeli. Pl. 39, fig. 155.

Yellowish red, with two white bands. Length, 19 mill.

Red Sea.

Described and figured from a single dead specimen.

M. ARENACEA, Dunker. Pl. 39. fig. 154.

Very closely and finely reticulated; yellowish white, clouded with chestnut. Length, 35 mill.

Habitat unknown.

M. GRACILIS, Reeve. Pl. 39, fig. 156.

White, clouded orange or chestnut and obscurely banded, with chestnut or chocolate spots on the granules; revolving sculpture most prominent. Length, 2 inches.

Isle of Ticao, Philippines, sandy mud, at six fathoms.

Very much like *M. scabriuscula*, Linn., but more slim; perhaps only a variety of that species.

M. STRANGEI, Angas. Pl. 39, fig. 157.

Rather thin, white, closely spirally ridged, the ridges on the last whorl alternately larger and smaller, crossed by very fine longitudinal lines. Length, ·6 inch.

Port Jackson, Australia.

M. CITHAROIDEA, Dohrn. Pl. 39, fig. 160.

White, with revolving ribs and longitudinal striæ. Length, 21 mill.

Habitat unknown.

This may possibly be an older individual of *M. Strangei*, Angas; if so, its name should have preference on account of priority of publication.

M. Norrisii, Reeve. Pl. 40, fig. 166.

White, under a black, thin, horny epidermis; surface very finely decussated. Length, 3·4 inches.

Habitat unknown.

Described from a unique specimen, thirty-five years ago; no others have been recorded.

M. nivea, Swainson. Pl. 40, fig. 167.

White, with obsolete, rather distant, orange-brown revolving lines, and a few scattered brown spots next to suture; encircled with very fine, punctured, impressed striæ. Length, 2·75 inches.

Isl. Annaa, on the reefs.

M. Isabella, Swainson. Pl. 40, figs. 168, 169; Pl. 39, figs. 159, 162.

Yellowish white, clouded and sometimes indistinctly banded with orange-brown; closely spirally ribbed, more or less clathrate by fine longitudinal lines. Length, 2·5–3·5 inches.

China.

Aperture small and narrow, shell contracted to a canal below. *M. Mörchii*, A. Ad. (fig. 169), is founded on an individual in which the spiral sculpture is more, and the longitudinal less prominent than in the usual form. *M. Herklotsiana*, Dohrn, an unfigured species from Japan, is said to have the longitudinal sculpture more prominent than *M. Isabella*, crossing the spiral ribs and cutting them into granules: it is probably not distinct. Perhaps this is like *M. loricata*, Reeve (fig. 162), described without locality, and which is very plainly a variety of *M. Isabella*. I find no distinctive characters in *M. Peasei*, Dohrn (fig. 159), described as from Australia, and said by Sowerby to come from Sandwich Islands.

M. Hebes, Reeve. Pl. 39, fig. 161.

Whitish or yellowish, slightly shouldered.

Length, 1·25–1·5 inches.

Habitat unknown.

M. FORMOSA, A. Ad. Pl. 39, fig. 163.

Whitish, clouded with chestnut; slightly round-shouldered. Length, 1·4 inches.

Moluccas.

I have not seen either this or the preceding species: the figures look much alike, and the difference in coloring is of little account, but *M. formosa* appears to have finer sculpture.

Section **Cancilla**, Swainson.

Shell fusiform, slender; with revolving, linear, elevated ridges, and no longitudinal ribs; outer lip thin, not dentate within.

M. FILARIS, Linn. Pl. 40, figs. 174–176, 180.

Pinkish white or yellowish white, with elevated, narrow, brown, beaded ridges. Length, 1·25–1·75 inches.

Mauritius, Philippines, Polynesia.

Mr. Garrett considers *M. nexilis*, Martyn, a distinct species; it is a shorter, stouter form than the type, but intermediate conditions are not wanting. Philippi considers *M. filosa*, Born (= *filaris*, L.), the equivalent of the obese form, and makes of the narrow form a var. *gracilis*, whilst a small race is designated as var. *Bernardiana*.

Var. NEXILIS, Martyn. Fig. 174.
Var. BERNARDIANA, Phil. Fig. 180.
Var. CIRCULATA, Kiener. Fig. 176.

The ridges are uncolored, sharper, devoid of granules; in some specimens the intermediate revolving striæ are most prominent, others are cancellated between the ridges, and others again show mostly the longitudinal inter-costal striæ. *M. circulata* has usually been considered a distinct species, but even in the coloring of the ribs there is a gradual change from the uncolored typical *M. circulata* to the full-colored *M. filaris*.

M. CREBRILINEATA, Sowb. Pl. 40, fig. 170.

This little shell resembles *filosa* (= *filaris*), but is narrower, and has more numerous and finely beaded ridges. Length, ·8 inch.

Mauritius.

Probably not distinct from *filaris*, but I have not seen a specimen.

M. TATHNÆ, Jickeli. Pl. 40, fig. 178.

Whitish or yellowish white. Length, 18–20 mill.

Red Sea.

I do not know the species; two specimens were collected.

M. SULCATA, Swainson. Pl. 40, figs. 171, 177, 182–184.

Brownish white or light brown, under a chestnut or chocolate epidermis. Length, 1–3·25 inches.

W. Coast of Central America.

I unite under this, the oldest name, several species agreeing with it in color and sculpture but varying somewhat in form and considerably in size; they are all inhabitants of the same region. The largest of these is *M. gigantea*, Swn. (fig. 177), then come in order of size, *M. Hindsii*, Reeve (fig. 182), *M. attenuata*, Swn. (fig. 184), *M. funiculata*, Reeve (fig. 183).

M. LINEATA, Swains., Pl. 40, fig. 172.

Whitish, longitudinally stained with chestnut, ridges chestnut. Length, 1 inch.

W. Coast of Central America.

Stouter, with a more acute shoulder than the last species, and differently colored; yet I suspect that it is only a variety of it.

M. BELCHERI, Hinds. Pl. 40, fig. 179.

Whitish, under a dark chocolate epidermis; sculpture consisting of flat, broad ribs and narrow, deeply cut intervening grooves. Length, 4·5 inches.

W. Coast of Central America; in mud, at 17 fathoms.—Hinds.

M. ÆGRA, Reeve. Pl. 40, fig. 181.

Whitish, clouded with yellowish brown; ridges smooth and close, interstices punctured. Length, 1·7 inches.

Habitat unknown.

M. PIA, Dohrn. Pl. 41, fig. 189; Pl. 40, fig. 173.

Yellowish white. Length, 2·25 inches.

Australia.

The locality is somewhat doubtful. *M. multilirata*, A. Ad. (fig. 173), said to be from the China Sea, may possibly be a juvenile example of it.

M. CARNICOLOR, Reeve. Pl. 40, fig. 185; Pl. 41, figs. 186, 187.

Whitish to yellowish brown, light pink or white within the

aperture; slightly shouldered, ridges close, with longitudinal striæ. Length, 1–1·25 inches.

Philippines.

Approaches too closely to the stouter varieties of *M. filaris*, L., in form and sculpture. *M. incarnata*, Reeve (fig. 186), and *M. pura*, A. Ad (fig. 187), are synonyms.

M. STRAMINEA, A. Ad. Pl. 41, fig. 188.

Thin, light yellowish white. Length, ·9 inch.

Habitat unknown.

M. FLAMMEA, Quoy. Pl. 41, figs. 190–193, 195–197, 199, 200.

White, stained and maculated with orange-brown; sometimes smaller ridges are developed between the principal ones; longitudinal striæ close, distinct. Length, 1–1·25 inches.

China, Philippines, Australia, Polynesia, Sandwich Islands.

This is not the *M. flammea* figured by Reeve, = *Philippinarum.* The principal synonyms are *M. flammigera*, Reeve (fig. 191), *M. interlirata*, Reeve (fig. 192), *M. tornata*, Reeve (fig. 196), *M. avenacea*, Reeve (fig. 193), *M. rufilirata*, Ad. and Reeve (fig. 197), *M. Novæ-Hollandiæ*, Sowb. (fig. 199), *M. hystrix*, Montr. (fig. 200).

M. ROBOREA, Reeve. Pl. 41, fig. 201.

Pyramidal, brown, corded throughout with narrow white ridges, columella two-plaited, plaits somewhat indistinct.

Length, ·75 inch.

Habitat unknown.

Judging from the figure, this little shell is a *Latirus* rather than *Mitra.*

M. DUPLILIRATA, Reeve. Pl. 41, fig. 202.

Whitish, longitudinally flamed with reddish brown; revolving ribs duplicate. Length, 1·15 inches.

Habitat unknown.

M. ANNULATA, Reeve. Pl. 41, figs. 203, 205–209.

Yellowish white, spotted, or clouded with chestnut or chocolate. Revolving ridges sharp; with sometimes intermediate liræ, and longitudinal striæ in the interstices, sometimes smooth.

Length, ·75–1 inch.

Red Sea, Ceylon, Philippines, New Caledonia, Polynesia.

It has a shorter spire than *M. flammea*, Quoy. The synonyms include *M. nitens*, Kiener (not of Risso or Blainv.), *M. insculpta*, A. Ad. (fig. 205), *M. amœna*, A. Ad. (fig. 206), *M. Fischeri*, Souverb. (fig. 207). The latter is unsculptured between the ridges: I have specimens which are plain between some of the ridges and well sculptured between others. Equivalent forms are *M. rosacea*, Reeve (fig. 208), and *M. acuta*, Sowb. (fig. 209). *M. rufescens*, A. Ad., an unfigured species, is probably synonymous with *annulata*.

M. ACUTILIRATA, Sowb. Pl. 41, fig. 204.

Pale rose, encircled with angular ridges, painted on the angles with interrupted red-brown lines, longitudinally striated between the ridges. Length, 1·4 inches.

Habitat unknown.

M. PHILIPPINARUM, A. Ad. Pl. 41, figs. 210, 211.

Whorls encircled with rounded ridges, and usually narrow sulci between them; light olive or yellowish white, with irregular chestnut or chocolate markings. Length, 1–1·2 inches.

Andaman Is., Philippines, Polynesia.

This species was first figured by Reeve, in mistake for *M. flammea*, Quoy. Sowerby also seems to have mistaken it, his *Philippinarum* being an entirely different species; in consequence of this error he has re-described and figured it as *M. semiconica* (fig. 211).

M. STRIGILLATA, Sowb. Pl. 41, fig. 212.

Whitish, longitudinally flamed with brown. Length, ·9 inch.

Habitat unknown.

I am not acquainted with this species; it seems to be very like *M. Philippinarum*, Ads.

M. BACILLUM, Lam. Pl. 41, fig. 213; Pl. 58, fig. 692.

Grooved towards the base; brown, with longitudinal, white, waved streaks. Length, ·9 inch.

Malacca, Australia.

There is some confusion regarding this species. The figure given by Deshayes does not correspond well with that in Reeve's Iconica. Mr. Sowerby makes *bacillum*, Reeve, not Lam. = his *M. strigillata;* but then he figures a shell similar to Reeve's

illustration for *bacillum*. Deshayes' figure appears to me to be very like *M. Philippinarum*, A. Ad.

M. PRUINOSA, Reeve. Pl. 41, fig. 215.

Pale brown, with short, narrow snow-like streaks, rather irregularly descending or striking out from the sutures; decussately engraved with longitudinal and transverse impressed lines.

Length, ·9 inch.

Habitat unknown.

A doubtful species.

M. FULGETRUM, Reeve. Pl. 41, figs. 216, 217, 198.

Transversely impressedly grooved, grooves narrow, very finely punctured; reddish chestnut, with conspicuous waved longitudinal white streaks. Length, 1 inch.

Isl. of Burias, Philippines; under stones at low water; *New Caledonia.*

Var. BOISSACI, Montrouzier (fig. 217).

Has the same sculpture, and differs only in presenting a series of quadrangular chestnut spots, appearing like interrupted longitudinal bands: they are the bands of *fulgetrum*, in fact, but interrupted by the impressed striæ. *M. Cyri*, Dohrn (fig. 198), is the same as *M. Boissaci*.

M. HANETI, Petit. Pl. 41, fig. 194.

Light yellowish. Length, 23 mill.

Hab. unknown (supposed to be not far from *Mazatlan, W. Coast of Mexico*).

M. MALLETI, Petit. Pl. 42, fig. 218.

Light chestnut or olive-brown; longitudinally striated between the angular revolving costæ. Length, 1 inch.

Habitat unknown.

Possibly only a well-grown, fresh specimen of *M. Haneti*.

M. CARINATA, Swainson. Pl. 42, figs. 219–223, 241.

Yellowish, olive or chestnut-brown; shoulder of whorls obtusely or sharply angulated or carinated; with distant impressed revolving striæ, sometimes covering a portion only of the body-whorl, sometimes altogether obsolete.

Length, 1–1·5 inches.

Cape Verd Isles; Sierra Leone, W. Coast of Africa.

M. Senegalensis, Reeve (fig. 221), appears to be a rude, dis-

torted growth of this species, and *M. Gambiana*, Dohrn (fig. 222), a non-shouldered and perhaps the normal form. I figure from Sowerby's Thesaurus (fig. 223), a shell called *M. Gambiana*, but which is decidedly of the *carinata* type. *M. astyagis*, Dohrn (fig. 241), is probably a color variety only.

M. TELESCOPIUM, Reeve. Pl. 42, fig. 225.

Whorls rudely shouldered, with impressed, punctured revolving striæ, often partially obsolete; chestnut-brown, with a superior white band, above which the color is lighter.

Length, ·75–1 inch.

Isle of Ticao, Philippines.

Very similar to the preceding species in form, but differing in coloration, etc. It appears to be a monstrosity, yet four specimens before me all agree closely with the heretofore published figures.

M. MÆSTA, Reeve. Pl. 42, fig. 226.

With revolving impressed striæ, yellowish brown to chestnut.

Length, ·85 inch.

Isle of Corrigidor, Philippines; in coral sand at ten fathoms —Cuming; *Andaman Islands* —E. A. Smith.

This also appears to be a distorted shell: I am not acquainted with it.

M. CINGULATA, A. Ad. *Habitat unknown.*

M. SPIRIPUNCTA, Garrett. *Viti Islands.*

Both unfigured species, apparently belonging to this section.

Section **Chrysame**, H. and A. Adams.

Shell ovate, spire and aperture usually about equal in length; whorls encircled by rounded ribs; inner lip with a few strong transverse plaits; outer lip with the margin crenate.

M. CUCUMERINA, Lam. Pl. 42, figs. 227–229.

Orange-red, with an interrupted band of white spots, and occasional white strigations. Length, ·75–1·25 inches.

Polynesia, on reefs.

Garrett remarks that Paumotus examples, which are much larger than obtained elsewhere, are sometimes nearly pure white. The animal is whitish with creamy yellow dots. Mr. Pease

mentions a uniform dark red variety of the shell as occurring at Ralick Island. *M. fraga*, Quoy (fig. 229), may be the young of this variety; it can scarcely be synonymous with *M. peregra*, Reeve, as supposed by Sowerby.

M. ADAMSONI, Gray. Pl. 42, figs. 230, 231, 240.

Longitudinally granulosely plicated, crossed by revolving impressed striæ. White or yellowish white, clouded with large reddish brown or orange-red blotches; a narrow superior white band; aperture brownish red, lip and columella deeper.

Length, 1–1·4 inches.

Philippines; Mauritius.

Very close to *M. cucumerina*, and may be only a variety of that species in which the occasional longitudinal folds become regular and rib-like.

M. Antoni, Küster (fig. 231), described without locality, from an immature shell, appears to be closely related, if not identical; in the latter case it would have priority.

M. TORNATELLOIDES, Reeve. Pl. 42, fig. 232.

Shell encircled by somewhat indistinctly punctured grooves; chestnut or reddish brown, with a white zone and longitudinal waved streaks. Length, ·5 inch.

Philippine Islands.

Evidently an immature shell; perhaps a young *cucumerina*.

M. CHRYSALIS, Reeve. Pl. 42, fig. 233.

Yellowish brown, with an interrupted band of white.

Length, ·6–·85 inch.

Polynesia; Bay of Islands, New Zealand.

Very closely allied to *cucumerina*, but differs in its smaller size, more compressed form and lighter color.

M. TURGIDA, Reeve. Pl. 42, figs. 234, 235.

Uniform pale luteous. Length, ·65–1 inch.

Philippines; Polynesia.

M. indentata, Sowb. (fig. 235), is the usual form and size of this species, Reeve's type being a specimen of extraordinary size.

M. PEREGRA, Reeve. Pl. 42, figs. 236–238, 224.

Dark red, revolving ridges tuberculate, tubercles white.

Length, ·75–1 inch. *Philippines; Polynesia.*

Sowerby considers this species as well as *M. nucleola*, Lam., identical with *M. fraga*, Quoy. The latter is apparently the young of *M. cucumerina;* the former is more like this shell in form but has not its markings, and the sculpture appears to be different.

M. porcata, Humph. (fig. 237), appears to be a synonym, and *M. miniata*, Anton (fig. 238), as figured by Küster can scarcely be different. *M. spadicea*, Dunker (fig. 224), is placed in the synonymy by Garrett; it is darker and smaller than the type, but usually spotted with white on the tubercles, although not so represented in the figure, copied from Sowerby. It may be considered a variety.

M. GRACILIOR, Carpenter. Pl. 42, fig. 239.

Red-brown, with sharp revolving lines, decussated at the upper part of the whorls by longitudinal riblets; plications of the columella inconspicuous. H., ·2 inch.

San Diego, Cal., on kelp-roots in deep water.

Dr. P. P. Carpenter named but did not describe this minute species; he referred it to *Mitromorpha*, a group belonging to the family Pleurotomidæ. Mr. Henry Hemphill, of San Diego, Cal., collected the original lot and it is from one of these that the figure is drawn. It is one of several similarly sculptured minute species occurring on the California coast. I figure it here to call attention to the group, as they may be Mitrids, although most probably Pleurotomæ.

M. NUCLEOLA, Lam. Pl. 34, figs. 145–147.

Dark red; the revolving ribs decussated by longitudinal sculpture. Length, 1 inch.

Indian Ocean? Java?

As already mentioned, Sowerby makes this species equivalent to *M. fraga*, Quoy, and *M. peregra*, Reeve: from the former it differs in form, from the latter in color and sculpture. Reeve's figure of it is so different from that in Kiener, that I doubt if it belongs to the same species. That Kiener's figure is not a good one, is self-evident; still it is the only authentic illustration, and I have therefore copied it.

M. TURBEN, Reeve. Pl. 42, fig. 242.

Closely and finely longitudinally ribbed, crossed by revolving impressed striæ. Orange-yellow. Height, ·75 inch.

Philippine Islands.

All the specimens collected by Mr. Cuming had the lower part of the outer lip absorbed or worn away, as in the figure.

M. TABANULA, Lam. Pl. 42, figs. 243–247.

Reddish chestnut to chocolate-color; whorls encircled by elevated keel-like ridges, varying in number, so that sometimes the interstices are as wide as the ridges, on other specimens merely narrow deeply engraved lines. Length, ·5–·66 inch.

Andaman Isles; Philippines; Polynesia.

I unite with this species several others, the types of which show some differences, but the series of specimens before me clearly indicates their indentity. Fig. 243 is the typical *tabanula:* to which I add *M. pediculus*, Lam. (fig. 244); *M. minor*, Sowb. (fig. 245), and *M. rotundilirata*, Reeve (fig. 246). *M. Caledonica*, Petit (fig. 247), can scarcely be distinguished from the short form of *tabanula*, such as *M. pediculus*, Lam.

M. HANLEYI, Sowb. Pl. 43, fig. 248.

Yellowish white, Length, ·5–·7 inch.

China Seas.

M. SOLANDRI, Reeve. Pl. 43, figs. 249–251.

Light chestnut to chocolate. Length, 1–1·3 inches.

Red Sea.

Reeve's original specimen was probably worn and faded. The relative width of ridges and grooves appears to vary as in *M. tabanula;* in the type (fig. 249), the former are narrower than the latter, whilst in Mr. Sowerby's specimen (fig. 250), they are more nearly equal; a dark shell of this stage is *M. Rüppellii*, Reeve (fig. 251); finally well-grown specimens have broad, somewhat flattened ribs = *M. planilirata*, Reeve.

M. VEXILLUM, Reeve. Pl. 43, figs. 253, 254.

Bright reddish orange, the incised lines which separate the rounded, slightly raised revolving ribs, are darker—sometimes chestnut-colored. Sometimes the ribs are obsolete, when the grooves are scarcely marked, except by the persistent color.

Length, 1–1·2 inches. *Philippines.*

Closely allied to the preceding species. *M. crassicostata*, Sowb. (fig. 254), is evidently the same.

M. AURANTIA, Gmelin. Pl. 43, figs. 255–258.

Orange to chestnut or light chocolate color, upper part of whorl encircled by a white band. Length, 1–1·5 inches.

Mauritius. Philippines, New Zealand, Polynesia.

M. nanus, Reeve (fig. 257), is a small variety or stunted growth, with the revolving ribs usually finer. *M. Michelinii*, Guerin (fig. 258), is a probable synonym; Sowerby's figure of it is, however, a *M. limbifera.*

M. PROSCISSA, Reeve. Pl. 43, figs. 259–262.

Whitish or yellowish, longitudinally stained with orange-brown, sometimes obscurely white-banded in the middle; interstices of the revolving ribs cancellate.

Length, 1·25–1·5 inches. *Mauritius, New Caledonia.*

M. rubiginea, A. Ad. (fig. 260), *M. carinilirata*, Souv. (fig. 261), and probably *M. consolidata*, Sowb. (fig. 262), are synonyms—the latter is described from a single specimen, without locality.

M. CRASSA, Swainson. Pl. 43, figs. 263–265; Pl. 44, figs. 270, 272.

Chestnut or chocolate color, usually white-banded above; whorls faintly striate throughout, striæ developing into ribs towards the base. Length, ·8–1·25 inches.

Philippines, on reefs, at low water, *Polynesia.*

It is easy to connect *M. Ticaonica*, Reeve (figs. 264, 265, 270), with this species, and I fear that it is allied too closely with *aurantia*, as well as with other species of the group. Material collected especially to show the extent of variation of a species rarely comes into the hands of the conchologist, the collector usually working with the desire to secure as many species as possible. *M. cœligena*, Reeve (fig. 272), is probably a synonym of *crassa*, the only difference being the possession of occasional white spots, promiscuously scattered over the surface.

M. AMBIGUA, Swainson. Pl. 43, figs. 266, 267, 268.

Orange-brown, indistinctly white-banded above; the incised revolving lines are punctate. Length, 1·5–2·5 inches.

Philippines, Viti Isles; under coral and stones, at low water.

Var. FULVA, Swainson. Fig. 267.

Chestnut- or chocolate-brown, with usually an irregular faint superior band; whorls encircled by punctured, engraved lines, sometimes with scattered white dots. Length, 1·75–2·5 inches.

Polynesia.

The animal, according to Garrett, is chestnut-brown, the creeping disk white, siphon pale brown, ocular region and tips of the tentacles white.

M. fulva appears to connect with *M. ambigua* in such a manner as to have justified Kiener in considering it a synonym. In deference to conchological opinion, I separate it as a variety, the typical examples being somewhat different in form from *M. ambigua*. *M. attenuata*, Reeve (fig. 268), is synonymous.

M. ADUSTA, Lam. Pl. 43, fig. 269; Pl. 44, fig. 276.

Variegated with chestnut- or chocolate-brown and yellowish, disposed in longitudinal flames, or nearly uniform brown, lighter on the periphery; upper part of the whorls compressed, making a sharp, crenulated ridge next the sutures; the impressed revolving lines are rarely punctate.

Polynesia, under coral, at low water.

A species which might almost as well be placed with the typical Mitræ as here; analogies of coloration and the succession of intermediate forms connecting it with the typical *Chrysame*, induce me to prefer for it the present position.

M. TAHITENSIS, Garrett.

An unfigured species, evidently allied to *M. adusta*, of which a single specimen, 37 mill. long, was found at Tahiti, Society Islands.

M. FULVESCENS, Swainson. Pl. 44, fig. 271.

Pale yellowish brown; whorls encircled with punctured incised lines. Length, 1·25 inches.

Isle of Annaa, on the reefs.

M. striata, Gray, is doubtfully referred here by Reeve, but evidently belongs to the genus or group *Strigatella*.

M. CORONATA, Lam. Pl. 44, figs. 273–275, 277, 281–283; Pl. 58, fig. 687.

Orange-brown to chocolate, dotted occasionally with white,

suture crenulations white-tipped, and white spots, sometimes confluent into an irregular band, below the sutures; revolving incised lines strongly punctate, sometimes obsolete on the middle of the body whorl. Length, 1·25–1·75 inches.

Red Sea; Philippines to *Sandwich Isles; Mauritius.*

M. aurora, Dohrn (fig. 277) is, I think, a synonym, although Mr. Garrett considers it distinct; it is a beautifully bright-colored form from Polynesia. *M. tiarella*, A. Ad. (fig. 275), is only a small form of *M. coronata*, and *M. assimilis*, Pease (fig. 281), is a young shell. Pease mentions the want of crenations at the sutures as the principal distinction from *M. coronata*, but the specimen sent to me by Mr. Pease shows these sutural nodes, and they are minutely white-tipped; although small, they ought not to have escaped his scrutiny. *M. marginata*, Sowb. (fig. 282), described from a single specimen, without locality, is probably also a young *coronata*. *M. floridula*, Sowb. (fig. 283), from Mauritius, has the engraved striæ deeper, the punctations wider than in the type form; the consequence is that the intermediate spaces appear more like revolving, broad ribs. I cannot agree with Sowerby that these differences are specific.

M. DIGITALIS, (Chemn.) Dillw. Pl. 44, fig. 278.

Yellowish, clouded with yellowish brown, sutural nodes white-tipped, surface irregularly spotted with white, larger spots, sometimes forming a more or less interrupted central band; incised striæ deeply punctate. Length, 1·5–2·25 inches.

Philippines, Polynesia.

M. LUGUBRIS, Swainson. Pl. 44, figs. 284–287.

Reddish chestnut to chocolate color, white beneath the sutures, and sometimes at base; encircled by impressed, punctured striæ crossed by close, rough growth-lines; sutures crenulated.

Length, ·8–1·4 inches. *Polynesia.*

Mr. Garrett thinks *M. lacunosa*, Reeve (Pl. 33, fig. 13), identical, but I can scarcely agree to this, as it appears to be totally dissimilar—in fact to belong to a different group (p. 113). *M. albofasciata*, Sowb. (fig. 286) said, perhaps erroneously, to come from So. Africa, appears to be a narrow, somewhat smoother form of *lugubris*. *M. coriacea*, Reeve (fig. 287) is probably a young *lugubris*.

M. PICEA, Pease. Pl. 58, fig. 685; Pl. 44, fig. 288.

Decussated by longitudinal ribs and revolving striæ; chestnut-brown with a superior narrow white band. Length, 7–9 mill.

Paumotus, Sandwich Islands.

Sowerby figures a shell (fig. 288), under the same name, but without author, which may be a dark, unbanded specimen of this species; if distinct, it must receive a new name.

M. UZIELLIANA, Crosse. Pl. 44, fig. 289.

Uniform yellowish brown; cancellated. Length, 1 inch.

? Tahiti.

Sowerby thinks this may be synonymous with *M. lugubris*, but it seems to have characters of sculpture and color which should distinguish it—at least until better known to conchologists.

M. FERRUGINEA, Lam. Pl. 44, figs. 279, 280, 290.

Yellowish or whitish, longitudinally stained with chestnut-brown, the markings interrupted so as to show a light band on the periphery. Length, 1·5–2·25 inches.

Philippines; Polynesia, coral reefs; *Mauritius.*

The animal is cinereous or pale luteous and slightly varied with reddish brown. *M. rubritincta*, Reeve (fig. 280), is a short, stout form, connecting with *ferruginea*, by a series of transitional forms. *M. clara*, Sowb. (fig. 290), an immature specimen, with a slight shoulder, appears to be merely a slender variety.

M. PUDICA, Pease. Pl. 44, figs. 291, 292.

With revolving ridges and longitudinal striæ; whitish or yellowish, variegated with smoky brown. Length, ·7–·9 inch.

Sandwich Islands.

With this I unite *M. nuxavellana*, Dohrn, an unfigured species which its author concedes to be a synonym; also *M. subrostrata*, Sowb. (fig. 292). These are all immature shells, and are evidently related to *M. ferruginea.*

M. CANDIDA, Reeve. Pl. 44, figs. 293, 294.

Whitish to chestnut, closely ridged, finely longitudinally striated between the ridges. Length, ·8 inch.

La Guayra, So. America.

Possibly identical with the next species. The locality needs confirmation.

M. CRENATA, Swainson. Pl. 44, fig. 295.

Yellowish brown, encircled throughout with rather distant, slightly elevated lines. Length, ·75 inch.

Bay of Xipixapi, W. Columbia; sandy mud at six fathoms.

M. LIENARDI, Souverb. Pl. 44, fig. 296.

Whitish, longitudinally flamed with light chestnut. Length, ·8 inch.

New Caledonia.

A much narrower shell than those which precede it.

M. WILLIAMSI, Newcomb. Pl. 44, fig. 297.

Whitish, with longitudinal orange flammules; finely longitudinally striate between the revolving ribs. Length, ·6 inch.

? Philippine Islands.

Described from a unique specimen.

M. LUCTUOSA, A. Ad. Pl. 44, fig. 298.

Brownish, with a white band near the suture; whorls flattened, with revolving liræ, the interstices clathrately punctate.

China Seas.

An obscure species, collected by the Samarang expedition many years ago.

M. RUTILA, A. Ad. Pl. 44, fig. 299.

Orange-red, sparsely maculated with white, a white band, spotted with orange next the suture. Length, 1·5 inches.

Habitat unknown.

M. PELLIS-SERPENTIS, Reeve. Pl. 44, fig. 300; Pl. 45, figs. 303–307, 314; Pl. 58, fig. 690.

Yellowish brown; surface decussated by longitudinal and revolving ribs. Length, ·9–1·25 inches.

Philippines, Mauritius, Polynesia.

Specimens in which the revolving ribs are most prominent, but cut into obtuse granules by the rugose growth-lines, have been called *M. granata*, Reeve (fig. 690). *M. brumalis*, Reeve (fig. 314), and *M. microstoma*, Sowb. (fig. 303), are narrow forms, with

the typical sculpture—a white variety of these has been distributed by the late Mr. Pease as a new species, *M. reticulata* (fig. 304) = *M. cretacea*, Sowb. (fig. 306). Mr. Reeve has called a slightly shouldered specimen *M. suturata* (fig. 305), and M. Recluz has figured and described a faded specimen as *M. Grelloisi* (fig. 307).

M. Nassoides, Sowb. Pl. 45, fig. 308.

Shell yellowish white, reticulately sculptured.
Length, 1·5 inches.

Mauritius.

A stouter shell than the typical *M. pellis-serpentis;* yet it may be only a well-grown state of that species.

M. serotina, A. Ad. Pl. 45, fig. 309.

Yellowish, with two obscure darker bands; surface reticulated.
Length, ·9 inch.

Marquesas (Adams); *Mauritius* (Sowerby).

M. dealbata, A. Ad. Pl. 45, fig. 311.

White; whorls planulate, distantly sulcate spirally, sulci evanescent in the middle of the body-whorl. Length, 1·2 inches.

Habitat unknown.

M. semiferruginea, Jonas. Pl. 45, fig. 310.

Whorls encircled by narrow, granulated ridges, interstices punctured; yellowish, upper part of body with longitudinal chestnut flames. Length, ·8 inch.

Habitat unknown.

Described thirty-five years ago from a single immature specimen in the Royal Cabinet at Copenhagen; it remains unconfirmed by additional specimens.

Unfigured Species.

M. cingulata, Phil. (Related to *M. peregra*, Rve.)
Hab. unknown.

M. Pæteli, Dohrn (Related to *M. nanus*, Reeve.) *N. Africa?*

M. propinqua, Garrett. *Society Islands.*

M. pusilla, King. *Habitat unknown.*

Section Striga'ella, Swainson.

This group is very generally recognized as a distinct genus, but it will be better to regard it simply as a section of *Mitra;* indeed no sharp line separates it from many of the species ranged under the preceding section; the principal distinctive characters being a more decidedly columbelliform appearance, a smooth surface, single color or with brown longitudinal flames and maculations. Of the two subgenera heretofore assigned here, the first, *Mitreola*, contains those species which connect the typical form with the last section of *Mitra;* the second, *Zierliana*, includes a number of species having a peculiar character of the aperture, and readily distinguishable from the other groups. Moreover the species of *Strigatella*, so-called, which possess the dentition differing so widely from *Mitra*, belong to this group *Zierliana*, which may therefore well be separated as a subgenus. Of the group *Strigatella* as thus restricted, the dentition remains unknown.

M. ACUMINATA, Swainson. Pl. 45, fig. 312.

Yellowish, sometimes with a lighter band in the middle, frequently invested with a slight epidermis. Length, 1 inch.

Philippines; Polynesia.

M. COARCTATA, Swainson. Pl. 45, fig. 313.

Yellowish, longitudinally clouded with chestnut.

Length, ·9 inch.

Isle of Annaa.

Only distinguishable by its painting from *M. acuminata.* It is very likely a variety.

M. BRUNNEA, Pease. Pl. 45, fig. 301.

Yellowish brown, spire rather obtuse.

Length, ·75–1·10 inches.

Polynesia.

The animal is milk-white.

M. NIGRICANS, Pease.

An unfigured species, blackish with a light band, and lead-colored aperture. Length, 20 mill.

Polynesia.

This species has not been identified by Mr. Garrett.

M. ASTRICTA, Reeve. Pl. 45, figs. 315–318.

Whitish, under a light olive, smooth epidermis, or yellowish obsoletely banded with brown, sometimes sparingly strigate.

Length, 1–1·5 inches.

Sandwich Islands.

M. Samuelis, Dohrn (fig. 317), is identical.

M. AURICULOIDES, Reeve. Pl. 45, fig. 319.

Chocolate-brown, with a whitish band on the upper part of the body-whorl, and sometimes white-dotted. The whole surface is encircled with fine punctated, incised lines, which are sometimes obsolete on the middle of the body. Length, ·8–1·1 inches.

Polynesia.

M. FASTIGIUM, Reeve. Pl. 45, fig. 320.

Light yellowish brown, faintly banded. Length, ·75 inch.

Habitat unknown.

Possibly a variety or faded example of *M. auriculoides*. I am not aware of the existence of any specimens besides the type.

M. MÖLLERI, Küster. Pl. 45, fig. 321.

Whitish, longitudinally flamed with chestnut.

Length, ·66 inch.

Habitat unknown.

An immature shell, described from a cabinet specimen at Gotha; I shall not attempt its identification.

M. LIMBIFERA, Lam. Pl. 45, figs. 322–326.

Chestnut- or chocolate-brown, usually with white or yellowish patches on the upper part of the body-whorl, forming a more or less continuous band; frequently with scattered light spots elsewhere; aperture columbelliform. Length 1–1·6 inches.

Philippines, Polynesia.

The shells are usually covered by a thin olive-yellow epidermis. The animal is rich chestnut-brown with a diluted-white creeping disk. Head slightly varied with white. The peculiar character of the outer lip of the shell increases in importance with age; *M. Columbellæformis*, Kiener (figs. 323, 324), being its adult or aged state. *M. striata*, Gray (fig. 325), is probably a synonym, as is also *M. Mitchelini* of Sowerby, not Petit (fig. 326).

M. MACULOSA, Reeve. Pl. 45, figs 327, 328.

Chestnut color under a deciduous corneous epidermis, a broad white band above the middle, and brown revolving lines, punctate with white towards the base. Length, 15–21 mill.

Red Sea, Australia, Polynesia.

M. Arabica, Dohrn (fig. 338), does not differ. Typically it is distinct enough from *M. litterata*, but there are varieties which certainly approach extreme examples of that species very closely.

M. TRISTIS, Swainson. Pl. 45, fig. 329.

Shell white or light-chocolate, under a persistent, smooth dark olivaceous or black-brown epidermis, with a yellowish band at the top of the whorls; frequently slightly round-shouldered, and rudely folded at the sutures, forming obsolete tubercles; aperture chocolate-colored. Length, ·75–1·25 inches.

Galapagos Is.; Panama to *Mazatlan.*

M. CHRYSOSTOMA, Swainson. Pl. 46, figs. 330, 331.

Whitish or yellowish, tessellated or strigated longitudinally with orange-brown or chocolate, interrupted by a white, irregular band on the periphery. Length, 1·35–2 inches.

Polynesia, Philippines, Mauritius.

Kiener has figured this species in error for *M. contracta*, Swn. (= *abbatis*), and Phillippi, discovering that this figure did not represent Swainson's species, has called it *M. Kieneri.*

M. SCUTULATA, Lam. Pl. 46, figs. 332–337.

Chocolate-brown, sometimes with merely an irregular, or interrupted yellowish or whitish band below the sutures; sometimes irregular small spots of the same color are on the lower portion of the body-whorl; sometimes these spots unite longitudinally into strigations above and below, but always leaving a central chocolate space—which thus becomes defined as a broad band. Length, 1–1·75 inches.

Philippines, Polynesia.

M. amphorella, Lam. (fig. 334), *M. decurtata*, Reeve (fig. 335), and *M. oleacea*, Reeve (fig. 336), and *M. sertum*, Duval (fig. 337), are synonyms.

M. LITTERATA, Lam. Pl. 46, figs. 338, 339.

Yellowish or whitish, with irregular, longitudinal chocolate

markings, sometimes appearing like rude letters, and interrupted more or less by revolving bands. Length, ·75–1 inch.

Red Sea, Java, Mauritius, So. Africa, Philippines, Polynesia.

In many specimens the dark color so predominates as to appear to be the ground-color, upon which are superimposed the yellowish spots and letters; I figure a shell which Sowerby has called *M. maculosa*, Reeve (fig. 339) which shows this variety pretty well. As already stated, the true *maculosa* closely approaches this form.

M. PAUPERCULA, Linn. Pl. 46, fig. 340.

Chocolate, with uninterrupted whitish or yellowish longitudinal strigations. Length, 1–1·4 inches.

Red Sea, E. Africa, Indian Ocean, Philippines, Polynesia.

M. VIRGATA, Reeve. Pl. 46, fig. 341.

Color and markings as in *M. paupercula*, but distinguished by smaller size, more abbreviate, Columbella-like form and conspicuous revolving grooves at the base of the shell.

Length, ·75–·9 inch.

Polynesia.

Mr. Reeve included two species in his *M. virgata*, his first figure being a species previously described by Lamarck, and which immediately follows this description. Some specimens of *virgata* have the Melampus-like form of *M. retusa*, but they appear to be constantly distinguished by the want of the white band and fewer and larger color flames.

M. RETUSA, Lam. Pl. 46, figs. 342–344.

Surface covered with revolving striæ; dark chocolate, with fine close, thread-like undulating longitudinal yellow or white lines, and superiorly a narrow yellow or white revolving band.

Length, ·75–1 inch.

Polynesia.

M. virgata, Reeve (fig. 341), in part, is synonymous with *M. retusa*, and *M. capillata*, Gould (fig. 344), is probably a juvenile of it.

M. ZEBRA, Garrett.

An unfigured Polynesian species, the description of which accords tolerably with *M. virgata*.

M. TIGRINA, A. Ad. Pl. 46, figs. 348, 347.

Glandiniform, with revolving striæ; longitudinally finely strigate with chocolate and yellowish or whitish, aperture chocolate. Length, 1·8 inches.

Mauritius.

A giant edition of *M. retusa*, but proportionally narrower than that species. *M. jucunda*, Tapparone-Canefri (fig. 347), is identical with it.

M. ANAÏS, Lesson.

An unfigured species from the Gambier Islands. It evidently belongs to the present group.

M. FUSCESCENS, Pease. (Unfigured.) *Sandwich Islands.*

Subgenus **Zierliana**, Gray.

In the introductory remarks upon the Strigatella section of Mitra (p. 153), I have stated the reasons which induce me to merge that group in the Mitras and to separate from it *Zierliana*, which H. and A. Adams and their successors have considered as a subgenus of *Strigatella*.

M. ZIERVOGELIANA, Gmelin. Pl. 46, figs. 345, 346, 349, 350.

Dark chocolate-brown, aperture and columella white or slightly tinged with light chocolate. Length, ·9–1·1 inches.

Philippines, Polynesia.

Sometimes the ribs are denuded of epidermis, and give a zebra-like coloration to the species.

Var. ROBUSTA, Reeve, Fig. 346.

Not so coarsely sculptured, with less shoulder and somewhat higher spire. This is the ordinary Polynesian form. It is littoral, under lava stones on rocky coasts.

Var. WOLDEMARII, Kiener. Fig. 349.

Still more finely sculptured and with higher spire than var. *robusta;* with which it insensibly connects.

Var. SOLIDULA, Reeve. Fig. 350.

Sculpture fine, lightly impressed, more or less obsolete in the middle portion of the body-whorl. The young shell which

Quoy described as *M. nigra* (= *M. Quoyi*, Desh., p. 122), may possibly be intended for this variety.

M. ÆTHIOPS, Reeve. Pl. 46, fig. 351.

Dark brown or olive-black, finely decussated. Length, 1 inch.

Solomon's Islands, Philippines.

Very much narrower than any of the forms of *M. Ziervogeliana;* yet it may be only a variety of that species. *M. creniplicata*, A. Ad. (unfigured) is said by Mr. Sowerby to be a synonym.

M. ANTHRACINA, Reeve. Pl. 46, fig. 352.

Shell covered by a smooth, black epidermis. Length, 1 inch.

Isle of Ticao, Philippines, on reefs at low water.—Cuming.

Differs from *M. Æthiops* only in the want of sculpture.

L. CHOAVA, Reeve. Pl. 46, fig. 353.

Blackish, smooth. Length, ·75 inch.

Isle of Johanna, Mozambique Channel —Hennah.

I do not know the species; except in being smooth, it resembles closely a juvenile of the typical *M. Ziervogeliana.*

M. ALBOMACULATA, A. Ad. Pl. 46, fig. 354.

Chocolate-brown, maculated with white next the sutures. Length, ·5 inch.

Habitat unknown.

I do not know the species.

M. COLUMBELLINA, A. Ad. Pl. 46, fig. 355.

Variegated with chestnut and white, with obsolete revolving lines.

Hab. unknown.

Mr. Sowerby's figure of this species shows a tuberculated shoulder, a character not referred to in the original description.

Undetermined Species of Mitra.

M. GRANULIFERA, OBLIQUATA, CLAVULUS, CONULARIS, CREBRALIS, of Lamarck.

M. CINEREA, APICATA, Reeve. H. & A. Adams' Genera.

M. OBSCURA, Hutton. *New Zealand.*

M. FUSOIDES, A. Adams. Sowerby, Thes. Conch. Index.

M. HANLEYANA, Dunker. *Japan.*

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M. SEMISTRIATA, Krynicki. *Caspian Sea.*

M. ORDINATA, Pease (*ubi*) Pætel's Catalogue. *Sandwich Islands.*

M. SECTILIS, M. PALLIDA, Pease. *Sandwich Islands.*

M. OBSCURA, Humphrey; M. MUTELINA, Duclos; M. GLOBOSA, Chemn.; M. CINCTA, Meuschen. H. & A. Adams' Genera of Shells.

M. TASMANICA, LEGRANDI, SCALARIFORMIS, SEMILIVIDA, FRANCISCANA, GRANATINA, Tenison-Woods. *Tasmania.*

M. RUSSA, Gould. *China Seas.*

M. SECALINA, Gould. *Ousima.*

M. LÆTA (*China Seas*); M. DELICATA (*Cape York, Australia*); M. ASPERULATA, (*Australia*); M. RETICULATA (*Port Essington, Australia*); M. PALLIDA (*Marquesas*); M. (VOLUTOMITRA) CINNAMOMEA (*Natal*); M. PUNCTOSTRIATA (*Ceylon*). All of Arthur Adams.

M. ANTONI (*Sandwich Islands*); M. GIBBA (*New Caledonia*); M. AUTUMNALIS (*New Caledonia*), of Dohrn.

M. LEUCOSTOMA, Swainson. *No locality.*

M. INTERSCULPTA, Sowerby. *Mauritius.*

M. HUMERALIS, Garrett. *Paumotus Is.*

Genus **THALA**, H. and A. Adams.

Mr. Garrett remarks * that some of the species included in this genus are Pleurotomoid shells; that the wrinkles or folds on the columella are not true plaits, but simply more or less irregular transverse rugosities, precisely of the same structure as observed in certain species of *Clathurella* and *Cithara*. Some of the species which he declares should be excluded from Mitridæ, appear to me to possess the character of the family, whilst in others, so minute are the specimens that it is difficult to decide whether they have plaits or not—the difficulty being enhanced by the poor state of preservation of several individuals. *M. todilla*, Mighels is one of the excluded species, yet it possesses them, as mentioned by Dr. von Martens. Of course the difficulty of deciding is enhanced with those species of which figures only are accessible. Unfortunately the animal is unknown; this is

* Leeds Jour. of Conch., iii, 2.

one of those cases where the dentition would be of much collateral value. I have preferred to retain all the species in Mitridæ rather than attempt to divide them upon insufficient data.

T. FOVEATA, Sowb. Pl. 47, fig. 356.

Cancellated, chocolate-brown. Length, ·5 inch.

Hab. unknown.

T. ROSEATA, A. Ad. Pl. 47, fig. 357.

Cancellated, pinkish white. Length, ·4 inch.

Hab. unknown.

Very closely allied to *T. foveata.*

T. SOLITARIA, C. B. Ad. Pl. 47, fig. 358.

Cylindrically fusiform, cancellated, brown. Length, ·4 inch.

Panama.

A single specimen obtained by the discoverer; I have not heard of its being found since.

T. EXILIS, Reeve. Pl. 47, fig. 359.

Violet-purple with a darker band; granosely decussated throughout with minute ridges. Length, ·66 inch.

Isle of Ticao, Philippines; under stones at low water.

T. TODILLA, Mighels. Pl. 47, fig. 360.

Whitish or light violet, sometimes obscurely banded or spotted; surface tuberculately cancellated. Length, ·35 inch.

Sandwich Islands.

Described as a *Pleurotoma*, the columellar plaits being indistinct.

T. MILIUM, Reeve. Pl. 47, fig. 361.

Chestnut-brown, cancellated. Length, ·35 inch.

Hab. unknown.

The figure is somewhat different from that of *T. todilla*, yet it may be that species.

T. RECURVA, Reeve. Pl. 47, fig. 362.

Pinkish or violet, minutely dotted here and there with brown; longitudinally sculptured, tranversely impressly striate.

Length, ·35 inch.

Island of Capul, Philippines; under stones at low water.

Certainly very closely allied to *T. todilla.*

T. GRATIOSA, Reeve. Pl. 47, fig. 363.

Pink or violet, minutely decussated. Length, ·4 inch.

Galapagos Islands.

T. MIRIFICA, Reeve. Pl. 47, fig. 364.

Pink or light violet, somewhat transparent, sometimes with a narrow white zone. Length, ·3 inch.

Philippines.—Cuming; *Paumotus.*—Pease.

Said to be thinner and more slender, with finer sculpture than *T. gratiosa*, but the specimens before me vary so much that it would be difficult to separate some of them from the figures of that and other species.

T. CERNICA, Sowb. Pl. 47, figs. 365–369.

Shell rosy orange. Length, ·65 inch.

Mauritius.

T. angustata, Sowerby (fig. 366), from same locality, presents no valid differences.

Var. ANGIOSTOMA, Pease. Fig. 367.

White, shaped like *T. mirifica*, but larger, with somewhat stouter and coarser sculpture. Length, 12 mill.

Paumotus.

Var. FUSUS, Souverbie, figs. 368, 369.

Slightly stouter than the type, light violet, or pink-white, obscurely banded. Length, 10 mill.

New Caledonia.

The above are from widely separated localities, and as there are slight differences, they may be distinguished as varieties for the present.

T. BREVICULA, Souv. Pl. 47, fig. 370.

Light violet. Length, 7 mill.

New Caledonia.

T. ADUMBRATA, Souv. Pl. 47, fig. 371.

Dirty white, maculate with chestnut, forming an interrupted band. Length, 10 mill.

New Caledonia.

Distinguished by its cylindrical form and very fine sculpture.

Unfigured Species.

T. JACULANDA, Gould. Allied to *T. recurva*, Reeve, but the sculpture is much more delicate. *China Seas.*

T. SALTATA, Pease. *Polynesia.*

T. EXQUISITA, Garrett. *Polynesia.*

T. VIOLACEA, Garrett. *Polynesia.*

Genus **MITROIDEA**, Pease.

The peculiar tubular and recurved anterior portion of the columella, the truncate outer lip, the numerous small columellar plaits, the smooth surface and outer lip will distinguish this genus upon conchological characters, although the animal and its dentition do not differ from *Mitra*. *Mitroidea* has four years' priority over *Mauritia*, A. Adams. The two species which H. and A. Adams included in their subgenus *Mutyca*, also belong here. If *Mutyca* had a sufficient diagnosis it would be entitled to precedence over *Mitroidea* on account of priority of publication, but its authors only perceived a portion of the characters of the group and made it an artificial section of *Mitra*. *Mitroidea* is closely allied to *Dibaphus*, but the latter has a shorter spire and is without columellar plaits.

M. MULTIPLICATA, Pease. Pl. 47, figs. 372, 373.

White, solid, polished under a thin light olive epidermis, with distant brown revolving lines and band-like maculations.

Length, 1–2 inches.

Polynesia ; Mauritius

Mr. Pease's species has never been figured, but the careful descriptions by himself and Garrett and the fact that he, like Adams, made his species the type of a new genus, leaves no doubt that *M. Barclayi*, H. Adams is synonymous with it. *Dibaphus Lœbbeckeanus*, Weinkauff (fig. 373), is the juvenile of this species. Sowerby, who does not mention Pease's prior name, changed *M. Barclayi* to *M. Dibaphiformis*, on account of the alleged prior publication of *Mitra Barclayi*, Hanley.

M. ANCILLIDES, Swainson. Pl. 47, fig. 374.

Pale fulvous yellow, or creamy white ; upper whorls minutely granulated. Length, 20 mill.

Paumotus Isles.

M. EBURNEA, Garrett.

Closely allied to *M. Ancillides*, but may be distinguished by its ivory-white color, more contracted base, smaller size and more robust form. Length, 12 mill.

Paumotus Isles.

I do not know this species; it has not been figured.

M. BELLULA, A. Adams. Pl. 47, fig. 375.

White, polished, with revolving striæ, upper whorls cancellated, a necklace-like row of reddish spots near the sutures.

Length, ·75 inch.

Isle of Capul, Philippines; on the reefs, low water.

Described from a young and possibly abnormal specimen; may it not = *Ancillides?*

M. TELUM, Sowb. Pl. 47, fig. 376.

Yellowish brown, lower half of body-whorl darker, smooth.

Length, 1·1 inches.

Mauritius.

I have not seen this species. The figure is very like *M. multiplicata* (*Barclayi*), which also inhabits Mauritius, but the columella does not show so many plications.

M. INFECTA, Reeve. Pl. 47, figs. 377–380.

Yellowish, marbled with chestnut-brown, sometimes forming two interrupted bands; revolving striæ inconspicuous or distinct.

Length, 1·25–1·5 inches.

Mauritius. Paumotus.

Sowerby says that Reeve's figure is erroneous, as it does not show the revolving striæ, and he gives another figure (fig. 378), which differs somewhat in form and coloring. Reeve's figure is probably from a worn specimen—Dohrn says, from the original specimen of *M. nebulosa*, Swains.; but *nebulosa*, as first figured by Reeve, is a very different species and = *M. versicolor*, Martyn. No doubt *M. Barclayi*, Hanley, not H. Adams, (figs. 379–380), is a synonym.

Genus **DIBAPHUS**, Philippi.

Differs from *Mitroidea* in the columella being without plaits. It resembles in general form *Conus mitratus*, as well as, more distantly, *Strombus terebellatus*, and Adams, Crosse, and others

formerly assigned to it a position between *Conus* and *Mitra*. The animal was first made known to science by Mr. A. Garrett in 1872,* who, after a careful study could not detect any difference between it and a *Cylindra*. On plunging a living example in alcohol, the spirit became much discolored, of a fine purple, the same as when any other Mitridæ are placed in spirits.

D. PHILIPPII, Crosse. Pl. 47, fig. 381.

Yellowish brown, or whitish, clouded with chestnut in the form of two interrupted irregular bands. Length, 1–1·75 inches.

Polynesia; Mauritius.

The earlier specific name *D. edentulus*, Swainson, has been displaced because the character indicated by it has become generic.

Genus **TURRICULA**, Klein.

The Turriculæ, including the old sections *Costellaria* and *Callithea*, are sand species; the section *Pusio*, however, contains reef-dwellers. The group is exclusively tropical and subtropical in distribution, its metropolis being Central Polynesia.

T. REGINA, Sowb. Pl. 48, fig. 382.

Whitish or gray, with orange bands bordered by narrow chocolate-colored stripes. Length, 2–3 inches.

Moluccas.

T. TÆNIATA, Lam. Pl. 48, figs. 383–390.

Yellowish or orange, with a broad white central band, partly visible on the spire, bordered with narrow chocolate bands; one or two additional chocolate bands below, sometimes replaced by a single broad one next below the white.

Length, 1·75–2·75 inches.

Philippines, Moluccas, Polynesia.

Has not the sharp angulation of the whorls of *T. regina*, but is otherwise closely allied to that species. *T. vittata*, Swainson (figs. 384–386), does not present any permanently distinctive characters, and scarcely merits the name of variety. *T. compressa*, Sowb. (fig. 387), is a narrow variety, not adult; like all the young of this species the base is reflected more than in the

* Zool. Proc., 843.

adult. *T. coccinea*, Reeve (fig. 390), is a color-variety in which the chocolate bands have disappeared; Sowerby has figured it under the name of *T. crocea*, Reeve—which is a very different species. *T. Tayloriana*, Sowb. (figs. 388, 389) is intermediate between *T. coccinea* and the typical coloration.

T. Dennisoni, Reeve. Pl. 48, fig. 391.

Yellowish or orange, stained with chocolate between the ribs, with a median white zone. Length, 2·25 inches.

Philippines.—Cuming; *Red Sea.*—Sowerby.

Sowerby figures a variety of this species which appears to connect it too closely with the preceding one of this monograph.

T. jucunda, Dunker. Plate 48, fig. 398.

Yellowish or orange brown, with a median, obscure white band. Length, 61 mill.

Saigon.

There is a thin, deciduous, pallid corneous epidermis. More finely sculptured and more regular in growth than the variety of *T. tæniata* represented by *coccinea*, Reeve, there is nevertheless considerable resemblance between them.

T. elegans, Reeve. Pl. 48, fig. 392.

Whitish or fleshy-brown, encircled with one or more narrow chocolate lines. Length, 1·1 inches.

Phillippines.

T. sanguisuga, Linn. Pl. 48, figs. 393–397.

Yellowish white to ash color, the ribs tipped with scarlet, sometimes with one or more chocolate bands, base and apex chocolate. Length, 1·5–2·25 inches.

Philippines, Mauritius, Polynesia.

Mr. Cuming found it in coral sand at low water, at the Philippines; Mr. Garrett, in sandy mud, at the Viti Isles—sometimes buried to the depth of two feet. The color variations are numerous; two of them have received names.

Var. stigmataria, Lam. Figs. 396, 397.

Lighter colored, with the scarlet spots confined to two revolving rows on the body-whorl, one on those of the spire.

Var. granosa, Chemn. Fig. 395.

Light colored, without scarlet spots.

T. STAINFORTHII, Reeve. Pl. 49, figs. 399, 400.

Whitish, base and apex ashy blue, ribs painted with square scarlet spots. Length, 1·25—2·25 inches.

Philippines.

The distant, rounded ribs, crossed by close striæ, and regular painting seem to distinguish this species sufficiently from *T. sanguisuga.*

T. MELONGENA, Lam. Pl. 49, figs. 401, 402, 407.

Chocolate or ash and white, in revolving bands and lines of variable thickness. Length, 1·5–2·5 inches.

Moluccas, Philippines.

T. LYRATA, Lam. Pl. 49, fig. 403.

Ribs narrow, sharp; light olive or ash, with narrow dark chocolate or blackish revolving bands. Length, 1·5–2 inches.

Philippines, Polynesia.

T. CURVILIRATA, Sowb. Pl 49, fig. 404.

Yellowish white, with chestnut or chocolate bands. Length, 1·25–1·75 inches.

China?

Distinguished from *T. melongena* by its curved ribs and painting, but may nevertheless be only a variety.

T. RADIUS, Reeve. Pl. 49, fig. 406.

Flesh color or brownish, with a brown band on the periphery. Length, 1 inch.

Philippines; Indian Ocean.

T. BALTEOLATA, Reeve. Pl. 49, fig. 405.

Spire and upper portion of body-whorl yellowish white, lower portion of the latter orange; a brown band separates the two colors, and another one or two are situated inferiorly. Length, 2·5 inches.

Moluccas, Philippines.

T. COSTELLARIS, Lam. Pl. 49, fig. 408.

Dark chocolate, with a superior narrow white band, and occasionally an obscure, wider, lower one. Length, 1·5–2 inches.

Philippines.

T. PEASEI, Garrett.

An unfigured species from the Viti Islands, has the coloring of *T. costellaris*. I do not know it.

T. VULPECULA, Linn. Pl. 49, figs 410–413.

Whitish, obscurely banded with orange, and tipped with dark chocolate at the sutures and base; or orange, with sometimes an obscure light band; or orange with dark chocolate bands, sometimes covering nearly the entire surface. Shoulder obtuse or sharply angulated. Length, 1·5–2 inches.

Moluccas, Philippines, Polynesia.

A variable species in form, sculpture and coloration. *T. umbrosa*, Sowerby (fig. 414), is said to have the ribs more defined than *T. vulpecula*, and raised into tubercles at the angle of the whorls; I might make several equally good species out of the series of *vulpecula* before me.

T. CAFFRA, Linn. Pl. 49, fig. 409; Pl. 50, fig. 424.

Dark chocolate, with two or three yellow zones, the upper one visible on the spire. Length, 1·75–2·25 inches.

Isle of Ticao, Philippines.

T. bifasciata, Swainson, has long been recognized as a synonym; *T. zonalis*, Quoy (fig. 424), may be added. This species approaches so near to the smoother forms of *T. vulpecula*, that their specific identity is not improbable.

T. PLICATA, Lam. Pl. 50, figs. 420–422.

Orange-yellow, with narrow superior and inferior brown bands, interrupted by the ribs, and a broad central band; whorls shouldered, with or without revolving striæ.

Length, 1·5–1·75 inches.

Philippines.

Var. PULLATA, Reeve. Figs. 421, 422.

Less shouldered, ribs rather closer, revolving striæ more distinct.

I use the name *plicata*, Klein, adopted by Lamarck, in preference to *plicaria*, Linn, the former being so well known, that it would be injudicious to displace it.

T. CINCTELLA, Lam. Pl. 50, fig. 423.

Whitish and gray or lead or yellowish in alternate zones, overlaid, on the body-whorl by one or several chestnut-colored lines. Length, 1·15–2·25 inches.

Moluccas, Ceylon.

T. INTERMEDIA, Kiener. Pl. 50, fig. 430.

Alternately zoned with ashy or chocolate-brown and white.

Length, 2–2·5 inches.

Moluccas.

This species is entirely too intermediate for the satisfactory separation of several other forms; in its smoother varieties it approaches very closely to chocolate-banded specimens of *T. vulpecula;* its long, costate varieties are allied to *T. costellaris*, Lam. and *T. cinctella;* its short, corrugated specimens are too near to *T. corrugata*, Lam. (= *T. rugosa*, Gmel.).

T. CORRUGATA, Lam. Pl. 50, figs. 429, 428, 427.

Whitish or ash color, banded with chocolate.

Length, 1·25–1·75 inches.

Indian Ocean, Philippines, New Guinea, Australia.

It is too late to revive Gmelin's prior name (*rugosa*) for this species. *T. Jukesii*, A. Ad. (fig. 428), is founded on juvenile Australian specimens. *T. fulvolirata*, Sowb. (fig. 427), is very close, if not identical.

T. BERTHÆ, Sowb. Pl. 49, fig. 417.

Ash or yellowish, encircled by narrow chocolate bands.

Length, 32 mill.

China Sea.

Appears to hold the same relation to *T. corrugata* that *cinctella* does to *costellaris.*

T. GRUNERI, Reeve. Pl. 49, figs. 418, 419, 416.

White, more or less distinctly banded with ash, with a superior, and sometimes one or two inferior narrow chestnut revolving lines, shell smooth between the longitudinal ribs.

Length, ·75–1·25 inches.

Ceylon, Philippines, Polynesia.

Resembles *T. Berthæ*, but is distinguished by wanting its revolving striæ. *T. cinctella*, of which it might be suppposed to be the young, has the earlier whorls closely ribbed, not shouldered. It may be the young of a variety of *T. plicata*, a species from which it is only distinguished by the character of its narrow bands. *T. modesta*, Pease (fig. 419), of which the type specimen is now before me is certainly identical; and so is *T. lævicostata*, Sowb. (fig. 416).

T. INTERRUPTA, A. Ad. Pl. 50, fig. 426.

Whitish, interruptedly banded with chocolate.
Length, 1·4 inches.

North Australia.

Differs in form from *T. corrugata.*

T. ORNATA, A. Ad. Pl. 50, fig. 425.

White with chestnut bands, or dark colored with white bands; revolving striæ between the ribs. Length, 1·25 inches.

Habitat unknown.

The ribs appear to be closer than in *T. corrugata*, but I fear that it will prove to be a variety of that species.

Section **Costellaria**, Swainson.

Shell smaller, with elevated spire, body-whorl anteriorly contracted, slightly ventricose in the middle, aperture sometimes internally striated.

T. ANGULOSA, Küster. Pl. 50, figs. 432, 431.

Yellowish white, stained or strigated with brown.
Length, 1·2–1·8 inches.

Philippines, Mauritius, Polynesia.

T. mirabilis, A. Ad. (fig. 431) is a synonym.

Mr. Garrett says that Viti Islands specimens are ashy-slate color, with a more or less distinct pale band just beneath the sutural angle.

T. NASUTA, Sowb. Pl. 49, fig. 415.

Subfusiform, white, with thin sinuously curved, rather distant ribs, and rather distant spiral striæ. Length, ·9 inch.

Habitat unknown.

I am not acquainted with this species.

T. DECORA, Reeve. Pl. 50, fig. 434.

White, with two brown bands. Length, 1 inch.

Habitat unknown.

Ribs more distant than in *T. angulosa*, but may be a variety of it.

T. SALMONEA, Sowb. Pl. 50, fig. 433.

Yellowish white, clouded with salmon color.
Length, 1·5 inches.

Habitat unknown.

T. Cumingii, Reeve. Pl. 50, figs. 435–439.

Longitudinal ribs rude, rounded; crossed by revolving rounded riblets, the interstices between the latter deeply impressed except where they cross the ribs. Whitish, sometimes spotted with brown, and usually brown-banded in the middle.

Length, 1–1·5 inches.

Ceylon, Philippines, Polynesia, Mauritius.

Besides a copy of Reeve's type (fig. 435), I give one from Sowerby's Thesaurus (fig. 436), which corresponds more nearly with the richly-colored specimens lineated with brown, found by Mr. Garrett at the Paumotus Isles. With this species must be united *T. clathrata*, Reeve (fig. 438), and *T. dimidiata*, Sowb. (fig. 437), which is now admitted by him to be a synonym.

T. rugosa, Sowb. (fig. 439), of which only a single specimen is known, appears to differ only in the somewhat greater prominence of the revolving sculpture on the body-whorl. I think it is the same species: if it is, then its priority of publication must cause the adoption of its name instead of that of *Cumingii*.

T. Montrouzieri, Souv. Pl. 50, fig. 440.

Yellowish brown, lighter at the angle of the shoulder.

Length, 1 inch.

New Caledonia.

T. lucida, Reeve. Pl. 50, fig. 441.

Ribs swollen at the upper part, transversely elegantly ridged; transparent white. Length, ·66 inch.

Philippines.

T. nodulifera, A. Ad. Pl. 50, fig. 442.

The figure given by Sowerby is white, but Mr. E. A. Smith describes a specimen from the Solomon Islands as pale pinkish with white ribs, the aperture orange. Length, 11·5 mill.

It possibly equals *T. lucida*.

T. modesta, Reeve. Pl. 50, fig. 443.

White, slightly tinged with pink towards the base, aperture pink. Length, ·8 inch.

Isle of Ticao, Philippines.

"A very chaste pink-white shell, with a highly relieved latticed sculpture."

T. PROPINQUA, Garrett.

An unfigured species resembling *T. modesta*, Reeve, but more contracted at the base, with much smaller and more numerous transverse ridges. Length, 15 mill.

Viti Islands.

T. CINERACEA, Reeve. Pl. 51, figs. 444, 445.

Ashy gray, with an interrupted white band at the shoulder, and white-tinged at the base. Length, ·75 inch.

Philippines.

T. JUDÆORUM, Dohrn. Pl. 51, fig. 446.

Orange-brown, ribs and base white. Length, 22 mill.

Red Sea, Mauritius.

A longer, narrower shell than *T. cineracea*, but may be a variety of it.

T. MILITARIS, Reeve. Pl. 51, figs. 447–455.

Yellowish brown, with a chestnut band. Length, 1 inch.

Isle of Ticao, Philippines.

Perhaps not distinct from *T. angulosa*, Küster, the difference being principally in its straighter ribs.

Var. ANTONELLI, Dohrn. Fig. 448.

Chocolate- or chestnut-brown, or dark gray, white-tinged or banded above.

Red Sea, Mauritius, Polynesia.

Specimens sent to me from the Viti Islands by Mr. Andrew Garrett, under the name of *T. mutabilis*, Reeve, are more slender than Sowerby's figure, approaching the form of *militaris* very closely.

Var. LUBENS, Reeve. Figs. 449–451.

Yellowish white, tinged with pink at apex and base.

Philippines.

T. compta, A. Ad (fig. 450), and *T. turricula*, A. Ad. (fig. 451), are synonyms.

Var. COPHINA, Gould. Fig. 453.

The figure of the type shows a shorter shell than the preceding, but specimens before me serve to connect it directly with var. *lubens*. A somewhat rounded instead of an angulated shoulder is the only difference, and that not constant. To this form may be referred the Sandwich Islands species *T. bella*,

Pease (fig. 452), yellowish white, interruptedly banded or marked with light chestnut; a faded, stumpy specimen of it was called *T. Wisemanni* by Dohrn.

As there is some diversity of sculpture and coloration in the typical shells above enumerated, I have thought it advisable to retain their names as varieties, for the sake of those who, less well provided with specimens than myself, may not be able to convince themselves that they are mere individual stages or local races perhaps, of one species. *T. cimelium*, Reeve (fig. 454), is a young shell referable to this species. The shell which Sowerby has erroneously determined as *T. rorata*, Gld. (fig. 455), may also be placed here.

T. INTERSTRIATA, Sowb. Pl. 51, fig. 456.

Longitudinal costæ smooth, distant, the interstices with spiral striæ. White, banded with orange, maculated with chestnut between the ribs. Length, 1·15 inches.

China Seas.

I have not seen this species, but think it will prove to be a variety of *T. militaris*.

T. CORBICULA, Sowb. Pl. 51, fig. 457.

Yellowish white, shaded with yellowish brown, the tubercles of the shoulder angle tipped with chestnut, forming a necklace-like row; interior of aperture light yellowish. Ribs and revolving riblets both close, forming granules. Length, ·8–1 inch.

Mauritius.

T. SULUENSIS, Adams and Reeve. Pl. 51, fig. 459.

Yellowish white, spotted with chestnut, forming two interrupted bands. Length, 1 inch.

Sooloo Islands.

T. COLLINSONI, A. Adams. Pl. 51, figs. 458, 460, 461.

Whitish, stained with brown at the apex, obscurely banded with bluish ash a little below the top of the whorls, and spotted irregularly with brown in the same part, generally between the costæ; lower half of the last whorl cinereous brown.

Length, ·75–1 inch.

Japan.

Differs from *T. Suluensis* in having a non-turreted spire, finer spiral sculpture, a shorter aperture, and in its color. The fore-

going description indicates such close affinity with *T. Suluensis*, however, that I think it would have been more prudent not to separate it. *T. fusco-apicata* (fig. 460) and *T. Gotoensis*, E. A. Smith, (fig. 461), are both synonymous, varying only slightly in sculpture and marking from the type.

T. CRUENTATA, (Chemn.) Reeve. Pl. 51, figs. 462–466, 468, 469; Pl. 58, fig. 686.

Chestnut or chocolate-brown, with a superior narrow white band, and occasionally an inferior one. Sometimes lighter colored between the band and the suture. Length, ·75–1 inch.

Indian Ocean, Philippines, Polynesia..

A very variable species, which has received a number of names.

Var. PROXIMA, Nevill. Figs. 464–466, 468.

The usual Polynesian form; when one-banded it has been called var. *Sandvichensis*, Nevill. *T. exarata*, A. Ad. (fig. 465), *T. ligata*, A. Ad. (fig. 466), and *T. vibex*, A. Ad. (Pl. 58, fig. 686) are synonyms. I think that *T. larva*, Lam. (fig. 468) may also be placed here.

Var. ARMILLATA, Reeve. Fig. 467.

A narrow form, with spire drawn out, typically very different from *cruentata*, var. *proxima*, but connected with it by Polynesian specimens before me.

T. SCHOMBURGKII, Angas. Pl. 51, fig. 470.

Livid brown, with a broad, pale, suffused band on each whorl, and four narrow, dark-brown lines encircling the last whorl, one above and three below the band. Length, 10 mill.

So. Australia.

I am not acquainted with this species.

T. BUCCINOIDEA, Sowb. Pl. 51, fig. 467.

Yellowish white, with a white central band bordered with chestnut on each side. Length, 4 inches.

Habitat unknown.

T. RAWSONI, Mörch.

An unfigured species, from the West Indies, is said to resemble *T. cruentata.*

T. FUSCONIGRA, Garrett.

An unfigured species, dark, brownish black, with a superior white spiral line. Length, 18 mill.

Viti Isles.

Three dead specimens found. I am not acquainted with it; appears to be closely allied to the preceding species.

T. SEMIFASCIATA, Lam. Pl. 51, figs. 472, 473.

Yellowish white or ash-gray on the upper part of the whorls, darker ash or orange on the lower part, encircled by two or three narrow chestnut lines. Length, ·75–1·25 inches.

Red Sea, Philippines, Polynesia.

T. SEMISCULPTA, Ad. and Reeve. Pl. 51, fig. 474.

Ash color tinged with pink, with a light, narrow revolving band on the periphery. Length, ·9 inch.

Sooloo Isles, Japan.

T. MUCRONATA, Swainson. Pl. 51, figs. 475–479; Pl. 52, figs. 480–482.

Whitish or yellowish, stained, spotted or irregularly banded with light chestnut. Length, 1–1·25 inch.

Red Sea; Polynesia; in sand, inside the reefs, shallow water.

Mr. Garrett says the animal is a rich brown, irregularly dotted with yellow on the back, the creeping disk cinereous, the siphon dusky with yellowish spots.

The shell varies considerably in proportions and in the development of the spinose tubercles; a smoother form is *T. concentrica*, Reeve, (fig. 476). I add as synonyms *T. fusiformis*, Reeve, not Kiener (fig. 477); *T. obtusispinosa*, Sowb. (fig. 478); *T. echinata*, A. Ad. (fig. 479); *T. nodilirata*, A. Ad. (fig. 480); *T. fusiformis*, Chemm. (fig. 481); a narrow variety, which, through *T. Dohrni*, A. Ad. (fig. 482), approaches *T. fusiformis*, Kiener.

T. VERRUCOSA, Reeve. Pl. 52, fig. 483.

Yellowish white, spotted or banded with pale brown. Length, 1 inch.

Philippines.

Closely allied to the preceding species, of which it may prove to be a variety.

T. FUSIFORMIS, Kiener. Pl. 52, figs 484, 485, 487–489.

Yellowish white, spotted or banded with brown.
Length, 1 inch.

Philippines.

Kiener figured this as *fusiformis*, Chemnitz, but it does not correspond with the illustrations in the Conchylien Cabinet; the latter represent a narrow form of *T. mucronata*, Swains. *T. spicata*, Rve. (fig. 487) appears to be a synonym. *T. turriger*, Reeve, (fig. 488) and possibly *T. armiger*, Reeve (fig. 489) are also to be placed here.

T. PURPURATA, Reeve. Pl. 52, fig. 490–492.

Ashy brown, with a conspicuous white zone; interstices of the ribs strongly latticed. Length, ·75 inch.

Red Sea; Philippines.

T. dædala, Reeve (fig. 491) and *T. cineracea*, Reeve (fig. 492) are probably synonymous.

T. FIDICULA, Gould. Pl. 58, fig. 693.

Yellowish brown with a central white band; ribs whitish, sometimes a little nodular at the shoulder angle. Length, ·75 inch.

Hab. unknown.—Gould; *Red Sea.*—M'Andrew?

M'Andrew's identification of a Red Sea form with this species is questionable.

T. CÆLATA, Reeve. Pl. 52, figs. 493–495.

Yellowish or chestnut-brown, with an indistinct lighter band. Length, ·5–·75 inch.

Philippines.

T. sculptilis, Reeve (fig. 494), appears to be the adult. Probably *T. mica*, Reeve (fig. 495), is a synonym.

T. INERMIS, Reeve. Pl. 52, fig. 496.

Chestnut, with a white band crossed by longitudinal brown zigzag lines. Length, ·75 inch.

Philippines; Japan.

Possibly a smooth variety of *T. cælata.*

T. RECTILATERIS, Sowb. Pl. 52, fig. 497.

Banded with chestnut and white; spiral striæ between the ribs. Length, 1·2 inches.

Habitat unknown.

T. RUBELLA, Ad. and Reeve. Pl. 52, fig. 498.

Yellowish brown. Length, 1 inch.

Sooloo Archipelago.

T. SCITULA, A. Ad. Pl. 52, fig. 499.

Yellowish white, sparsely punctate with chestnut. Length, ·5 inch. *China Seas.*

A young shell, the position of which is not readily determinable.

T. INTERTÆNIATA, Sowb. Pl. 52, fig. 500.

Ash color with narrow chestnut bands. Length, 1 inch.

Habitat unknown.

Possibly = *T rectilateris*, Sowb.

T. RUSTICA, Reeve. Pl. 52, fig. 501.

Whitish, lower part of the shell ash color, with occasional brown dots upon the middle of the whorl. Length, ·75 inch.

Habitat unknown.

A species having no marked characteristics.

T. DESHAYESII, Reeve. Pl. 52, figs. 502–507, 486.

Turreted, with an angle at the shoulder, longitudinal ribs small, rounded, interspaces wider, smooth; white or ash color, with chestnut revolving bands, usually tipping the ribs only and thus appearing as rows of spots. Length, ·75–1 inch.

Red Sea, Indian Ocean, Mauritius, New Caledonia, Polynesia.

First described from a poor specimen, in which the upper portions of the ribs only are distinct, and the bands not well defined. The shell which Reeve figures as *T. rigida*, Swainson (fig. 504), is synonymous—the true *rigida* being equivalent to *T. semifasciata*, Lam. Other synonyms are *T. Michaudi*, Crosse and Fischer (fig. 505), proposed for *T. rigida*, Reeve, not Swainson, *T. Dunkeri*, Schmeltz MSS., and *T. alauda* of Sowb. (figs. 506, 507), not Quoy, Voy. Astrol. as quoted by Sowerby—no such species occurring in that work. I figure also, a variety of uniform dark chocolate color.

T. AMANDA, Reeve. Pl. 52, fig. 508.

Ribs crossed by fine revolving striæ, a little nodulous next the suture; alternately banded with light chestnut and white. Length, ·5 inch.

Indian Ocean, Philippines, Polynesia.

T. FESTIVA, Garrett.

Unfigured. Resembles *Deshayesii*, Reeve.

Viti Islands.

T. PULCHRA, Garrett.

Unfigured. Resembles *Deshayesii*, Reeve.

Viti and Samoan Islands.

T. CASTA, H. Ad. Pl. 52, fig. 509.

White. Length, ·4–·75 inch.

Red Sea.

The name being preoccupied in *Mitra*, Sowerby changed it to *hastata*.

T. FILISTRIATA, Sowb. Pl. 52, fig. 514.

Fulvous, lower part of the body-whorl with pale brown flames. Length, ·9 inch.

Habitat unknown.

Very probably equivalent to the preceding species.

T. SUBULATA, Lam. Pl. 52, figs. 510, 511.

Flesh-color clouded with orange-brown.

Length, 1·5–2·25 inches.

Polynesia.

The shoulder is not always distinctly marked. There is frequently a Terebra-like appearance given to this shell by the first incised revolving line below the suture, being deeper than the others.

T. MACROSPIRA, A. Ad. Pl. 59, fig. 512.

Whitish or yellowish, with rows of chestnut spots.

Length, 2 inches.

Habitat unknown.

This, like the preceding species, has the aspect of a *Terebra*, but it is stouter than *T. subulata*.

T. LINCOLNENSIS, Angas. Pl. 52, fig. 513.

Whitish, with irregular longitudinal chestnut flames, a narrow band of interrupted spots on the centre of the whorls, lower half of body-whorl chestnut, with a faint band of reticulated brown and white spots in the middle. Length, 7 lines.

Port Lincoln, So. Australia.

T. CATENATA, Swainson. Pl. 53, fig. 515.

White, with large irregular chestnut-brown spots, arranged in bands. Length, ·5 inch.

Isle of Annaa, Polynesia.

An obscure shell, probably not adult.

T. LILACINA, Sowb. Pl. 53, fig. 516.

Shell finely decussated; ash color, lighter at the suture. Length, ·6 inch.

Habitat unknown.

T. MARMOREA, A. Ad. Pl. 53, figs. 517, 518.

Olivaceous, marked with reddish brown; longitudinally costate, costæ thick, subnodose above, interstices with revolving striæ. Length, ·5 inch.

Isle of Negros, Philippines; coarse sand, ten fathoms.

Sowerby's two illustrations, the only figures of this species heretofore published, and which I copy, appear to represent two different species.

T. ARRACANENSIS, Sowb. Pl. 53, figs. 519.

Brown, with a median white line, ribs lighter colored. Length, ·65 inch.

Arracan.

T. CREBRILIRATA, Reeve. Pl. 53, figs. 521–526, 530.

Light chestnut or olive, tops of ribs lighter, with usually a narrow central brown band, and a superior white line; ribs narrow, interstices with close revolving striæ. Length, 1·25–1·75 inches.

Indian Ocean; Japan; Philippines; Polynesia.

Reeve hesitated to describe this as a distinct species from his *M. polita*, to which, he says, it bears the same relation that the ribbed does to the smooth variety of *M. ebenus*; I venture, nevertheless, to locate the two species in distinct groups. I do this, whilst expecting that Reeve's suspicion of their identity will be confirmed, as it is a case paralleled by many others in this genus, all pointing to the evanescent nature of the sculpture and patterns of coloring. In fact, unless we set up an artificial standard for the separation of species, in some genera, we should have no species remaining, to speak of. *T. rosea*, Kiener, not Duclos (fig. 522), *T. tenuilirata*, Sowb. (fig. 523), *T. rubricata*, Reeve (fig. 524), *T. subtruncata*, Sowb. (fig. 525), *T. Layardi*,

A. Ad. (fig. 526), *T. Japonica*, A. Ad. (fig. 530), are all synonyms.

T. Zebuensis, Reeve. Pl. 53, figs. 527–529, 520.

Yellowish white, blotched or spotted irregularly with chestnut. Length, 1·25–1·5 inches.

Philippines; Polynesia.

The synonyms are *T. rorata*, Gould (fig. 520), *T. prætexta*, Sowb. (fig. 529).

T. rufomaculata, Souverbie. Pl. 53, fig. 531.

Whitish, with four revolving series of chestnut maculations; intervals of the ribs with punctate revolving striæ. Length, 1 inch.

New Caledonia.

Described and figured from a single specimen.

T. acupicta, Reeve. Pl. 53, figs. 532, 533.

White, tinged with yellowish or pink, profusely spotted and maculated with chestnut or chocolate color. Length, 1·25 inches.

Red Sea, Andaman Isles, Cochin China, Zanzibar, Mauritius.

Sowerby figures a variety in which the ribs are less numerous but more prominent than in the type.

T. puncturata, Sowb. Pl. 53, fig. 534.

Pink, maculate and flammulate with reddish brown; interstices of the ribs profoundly punctate. Length, 20 mill.

Habitat unknown.

Described from a single specimen.

T. obeliscus, Reeve. Pl. 53, fig. 535.

Chestnut-brown, with a central white band, and sometimes an inferior narrower one.

Andaman Islands, Philippines, Viti Islands.

Reeve's figure is from a faded specimen. G. and H. Nevill have described a var. *Andamanica*, but it has no differential characters. It is possible that *T. obeliscus* is a non-angulated form of *T. cruentata*, Chemn.

T. Macandrewi, Sowb. Pl. 53, fig. 536.

Fawn color, lighter on the periphery. Length, ·6 inch.

Red Sea.

A juvenile shell with no distinctive features. It may be a young *obeliscus*.

T. FLEXICOSTATA, Garrett.

An unfigured species, allied to *T. obeliscus*. Length, ·6 inch.

Polynesia.

T. RADIX, Sowb. Pl. 53, fig. 537.

Like *obeliscus*, but the costæ more distant, curved; orange-brown with a white superior band. Length, 1 inch.

Habitat unknown.

T. LONGISPIRA, Sowb. Pl. 43, fig. 538.

Fawn-colored, light banded in the middle. Length, ·9 inch.

Habitat unknown.

One of a number of very doubtful specimens, once forming part of a private collection, and which, coming into the hands of Mr. Sowerby, have been described by him as new species.

T. ÆTHIOPICA, Jickeli. Pl. 53, fig. 539.

A miserable little young shell, the description of which is of advantage to Mr. Jickeli, perhaps. Length, 4 mill.

Red Sea.

May be identified with anything.

T. CRISPA, Garrett. Pl. 53, fig. 540.

White or yellowish white, with usually a central darker band; ribs sharp, flexuous, somewhat distant, interstices foveolate, the revolving ridges being thread-like and well raised.

Length, ·65–·8 inches.

Samoa and Viti Isles.

T. EXASPERATA, Gmelin. Pl. 53, figs. 541–544; Pl. 54, figs. 545, 546.

Whitish or yellowish usually two-banded with chestnut to dark chocolate, sometimes colored only on the ribs.

Length, ·75–1 inch.

Red Sea, Indian Ocean, Java, Philippines, Polynesia.

T. arenosa, Lam. (figs. 545, 546), is a synonym, and not entitled to varietal distinction as its typical form is connected with *exasperata* by almost insensible gradations: Reeve's reason for retaining it as a species is curious; he says: "M. Kiener regards this species as a variety of the following (*exasperata*), but I do not think it expedient to follow his opinion. One-half of the established species may be dispensed with were every one of two that approximate abandoned upon the discovery of their intermediate link." Mr. Garrett gathered thousands of living

specimens by digging in clear sand and sandy mud at the Tonga and Viti Isles. All the Mitres of this type bury themselves in sand and only come to the surface during the night. The shell is minutely granulated by the crossing of the sculpture. The ribs vary considerably in size and number, and are sometimes obsolete. The angle on the shoulder is also subject to variation and is occasionally very indistinct. The color is white or cinereous, and sometimes nearly uniform blackish brown. The ribs are frequently lineated with light brown or blackish brown, the lines often interrupted so as to form two transverse rows of linear spots—which gradually merge into the conspicuously banded and more closely ribbed variety which represents Lamarck's *arenosa*. *T. cadaverosa*, Reeve, the description of which follows, is possibly a marked variety only of this species.

T. CADAVEROSA, Reeve. Pl. 54, figs. 548–554.

Whitish, with a narrow chestnut or chocolate band, either continuous or interrupted by the ribs. Length, ·65–·9 inch.

Red Sea, Indian Ocean, Mauritius, Philippines, Polynesia.

The shell is more stumpy, usually smaller, less disposed to granulation than *T. exasperata*, and its single band, when not continuous, appears in the interstices of the ribs, unlike the interrupted bands of *exasperata*, which appear on the backs of the ribs: I am by no means certain that it is distinct, however. In the Polynesian Islands it lives buried in the sand.

The synonyms are *T. Pacifica*, Reeve (fig. 550), *T. Pharaonis*, Issel (fossil), *T. mutabilis*, Reeve (fig. 551), and *T. brevicaudata*, Sowb. (fig. 552). *T. Wisemanni*, Dohrn, an unfigured species is referred to this synonymy by Jickeli,* but I agree with Mr. Pease that it agrees better with his *T. bella* (= *militaris*). *T. Appelli*, Jickeli (= *Pharaonis*, H. Ad., not Issel) is at most a variety (fig. 553), and *T. subquadrata*, Sowb. (fig. 554), is synonymous with it.

T. ASPERRIMA, Dohrn. Pl. 54, fig. 547.

Orange-yellow, white upon the shoulder of the whorls. Length, 22 mill.

Habitat unknown.

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* Jahrb. Mal. Gesell., i, 37.

Described from a specimen in the Hanley collection. Three examples, without locality, are also in the collection of the Philadelphia Academy.

T. SPRETA, A. Ad. Pl. 54, fig. 555.

Light yellowish brown. Length, ·25 inch.

Japan.

A juvenile shell. It is not at all probable that it is distinct from one of the previously described species: judging from the figure it could be safely referred to any one of half a dozen species, including the last.

T. ROSEOCAUDATA, Hanley. Pl. 54, fig. 556.

Light yellowish brown. Length, ·2 inch.

Habitat unknown.

Probably a starved, rugose, young specimen of *T. cadaverosa*.

T. LATERCULATA, Sowb. Pl. 54, fig. 557.

Yellowish brown, with a central band, bordered on each side by a row of brown spots. Length, ·7 inch.

Habitat unknown.

T. ZELOTYPA, Reeve. Pl. 54, fig. 558.

Alternately banded with yellowish brown and white. Length, 1 inch.

Habitat unknown.

Section **Pusia**, Swainson.

Shell small, ovate, more or less ribbed or nodulous; spire usually short, convex, with obtuse apex; outer lip sometimes thickened.

T. DERMESTINA, Lam. Pl. 54, figs. 559–566.

Chestnut or chocolate-brown more or less spotted with yellowish white on the ribs, with a superior interrupted white band and an inferior narrower one. Length, ·75 inch.

West Indies; Paumotus; Sandwich Islands; Red Sea?

The West Indian habitat of this species is established by Mörch, Krebs, Swift, etc.; the Paumotus are given on the authority of Hugh Cuming; Mr. Pease reports it from the Sandwich Islands, M'Andrew from the Red Sea. Probably the latter is a mistaken identification; but specimens from the two oceans are alike and cannot be specifically distinguished. The

synonyms are *T. cavea*, Reeve (fig. 560), reported by Beau from Guadeloupe, W. I.; *T. Adamsi*, Dohrn (fig. 561), described from a worn specimen; *T. pulchella*, Reeve, (fig. 562); *T. pisolina*, Lam. (fig. 563); *T. ansulata*, Sowb. (fig. 564); and *T. histrio*, Reeve (fig. 565), a brilliantly colored form.

Var. CONSANGUINEA, Reeve, fig. 566.

Orange to brown, with a revolving row of white spots, and scattered spots on the base and spire. Length, ·75 inch.

It varies considerably in the length of the spire. It is frequently confounded, says Mr. Garrett, with *T. dermestina*, with which it is very closely allied.

T. TATEI, Angas. Pl. 54, fig. 567.

Yellowish brown, with two chocolate bands. Length, 3 inches.

So. Australia.

T. MICROZONIAS, Lam. Pl. 54, figs. 568, 569.

Dark chestnut or chocolate-brown, with a row of white spots on the ribs at the periphery, forming an interrupted band or necklace; sometimes an inferior narrow band.

Length, ·5–·75 inch.

West Indies; Polynesia.

Mörch, Krebs and Swift report it from the West Indies, Cuming and Garrett from Polynesia; specimens from both localities before me are precisely similar. The species is distinguished with difficulty from varieties of *T. dermestina*, and will, I think, prove to be synonymous with it.

T. GEMMATA, Sowb. Pl. 58, fig. 688.

Brown, usually slightly angular above the middle; ribs distinct on and above the angle, becoming obsolete below it; angle with a band of white spots. Length, 8–10 mill.

Habitat unknown.

Three good specimens are before me; with the general character of *M. microzonias*, they have a much narrower form.

T. PARDALIS, Küster. Pl. 54, figs. 573–575.

Yellowish to chocolate-brown, with an interrupted or confluent white band composed of irregular spots; the tops of the longitudinal ribs lighter in color, sometimes white.

Length, ·6 inch.

Red Sea; Philippines; Mauritius; Polynesia, on coral reefs.

Küster described his species from young specimens; there can be no doubt, however, of its identity with the forms subsequently characterized by Reeve as *T. lauta* (fig. 574), and *T. leucodesma* (fig. 575). Reeve's figure of *T. pardalis* is a *Columbella*.

T. MEDIOMACULATA, Sowb. Pl. 55, figs. 581, 582.

Somewhat indistinctly plicately ribbed, ribs smooth, wide, close together, interstices with revolving striæ; sculpture altogether obsolete on the back of the last whorl; rich chestnut-brown, broadly white-banded, with a row of square, regular brown spots in the centre of the band. Length, ·5 inch.

Mauritius.

T. Cernica, Nevill (fig. 582) is a synonym.

T. PUELLA, Reeve. Pl. 55, fig. 583.

Dark chestnut or chocolate with jagged flames or spots of white, frequently confluent around the suture Surface polished, with obsolete, minute, decussating sculpture. Length, ·3–·4 inch.

West Indies.

T. TURTURINA, Souverbie. Pl. 55, fig. 584.

Smooth, polished, solid, columbelliform, with revolving striæ; dark chestnut, with small white revolving points or spots.

Length, ·5 inch.

Loyalty I., New Caledonia.

Resembles the preceding species, differing in its columbelliform aperture, and the disposition of the spots.

T. CREMANS, Reeve. Pl. 55, fig. 585.

Dark chocolate, with an irregular white band, tending to spread longitudinally on the tops of the distant folds or ribs, these being sometimes obsolete; irregularly white-banded near the base; when the shell is fresh, close, very fine spiral lines are visible. Length, ·5–·6 inch.

Philippines.

The figures of Sowerby and Reeve are both taken from smooth uncharacteristic specimens. It is near *T. pardalis*. *M. Timorensis*, Dohrn, an unfigured species, from the island of Timor, is apparently synonymous.

T. ALVEOLUS, Reeve. Pl. 55, fig. 586.

Longitudinally finely ribbed, base with revolving grooves;

whorls dark chocolate, tessellated with white around the upper part, and on the spire. Length, ·5 inch.

Habitat unknown. (*Red Sea?*)

I am not acquainted with the species; it may be a variation of *T. pardalis*.

T. APERTA, Sowb. Pl. 55, fig. 587.

Slightly ribbed; chocolate, with an irregular yellowish band. Length, ·7 inch.

Habitat unknown.

Described from a single specimen in the late Taylor collection.

T. MILLECOSTATA, Swainson. Pl. 55, fig. 588.

Closely, finely longitudinally ribbed, with impressed revolving striæ at the base; orange yellow to dark chestnut-brown, sometimes with two interrupted lighter bands. Length, ·5 inch.

Island of Annaa.

T. LUCULENTA, Reeve. Pl. 55, figs. 589–594.

Short pupæform, with obtuse apex; or ventricose in the body-whorl, with a more or less angulated periphery, and distantly irregularly folded or ribbed; sometimes narrow. Color alternate revolving bands of white or light yellowish and dark chocolate or black. Length, ·5 inch.

Philippines; Polynesian Islands, on coral reefs.

A species of very variable form, and sculptured or smooth; the typical state is pupæform furnished with white bands as wide or wider than the black ones (fig. 589); a more ventricose shell with the black bands proportionately wider is *T. dichroa*, Ad. and Reeve (fig. 590); a still more ventricose and more usual form has been called by Mr. Crosse *T. Græffi* (fig. 591); it is ribbed, and the white bands are narrow; Sowerby has redescribed it under the name of *T. nigrofasciata* (fig. 592). A narrower variety of the shell with narrow white bands Mr. Sowerby calls *T. lævizonata* (fig. 593). To complete the synonymy, we may probably add *T. tricolor*, Montr. (fig. 594) in which there are indistinct rufous bands in the middle of the white bands; this is not a constant character, as in a specimen sent to me by M. Crosse, the rufous markings are not visible. Tapparone-Canefri has changed the name to *Montrouzieri*, that of *tricolor* being preoccupied. Mr. Garrett remarks of this

species that "they are usually found associated with *Engina mendicaria*, which they resemble so closely in shape and color as to be easily mistaken for small specimens of the latter species. Mr. Crosse's figure, which is slightly enlarged, very correctly represents the usual form. They, however, frequently differ in being more slender, and the ribs are sometimes nearly obsolete. Animal black. The foot is oblong, margined with yellow, slightly auriculate in front, and about three-fourths the length of the shell. Siphon rather long, irrorated with white. The pale tentacles are marked by two black zones."

T. LOTA, Reeve. Pl. 54, fig. 570.

Pale reddish orange, variegated with brown. Length, ·75 inch.

Isle of Ticao; Philippines.

A species of no determinate character, closely allied to or identical with *T. microzonias*, Lam. Sowerby considers it a synonym of *T. pisolina*, Lam., a species which I believe to be identical with *T. dermestina*.

T. GLANDIFORMIS, Reeve. Pl. 54, fig. 571.

White, variegated with brown. Length, ·5 inch.

Red Sea; Indian Ocean.

Messrs. G. and H. Nevill say that *T. dædala*, *radius* and this species are identical, running together through intermediate forms; the types are so different, however, that having no series of specimens by which to verify this for myself, I prefer to keep them distinct.

T. CITHARA, Reeve. Pl. 55, fig. 599.

Light purple-brown with a narrow, pale band. H., ·75 inch.

Hab. unknown.

T. APPROXIMATA, Pease.

Shell ovate, turreted; whorls convexly angulated at the sutures, longitudinally ribbed, crossed by impressed striæ; interstices punctured; aperture striated within; columella four-plaited. Color white, banded and blotched irregularly with chestnut-brown.

Sandwich Islands.

Not figured. Not seen by either Mr. Garrett or myself.

T. Bronni, Dunker.

An unfigured species said to be very like *T. glandiformis*, Reeve, but much larger, narrower, paler in color, and somewhat curved before. Length, 20 mill.

Japan.

T. Kraussi, Dunker.

An unfigured species, resembling the preceding, somewhat, and also recalling the narrow variety of *T. microzonias*. It is found in the Japanese seas.

T. crocata, Lam. Pl. 55, figs. 595–597.

Reddish orange or yellowish brown, with a superior narrow white band. Length, ·75–1·25 inch.

Philippines; Polynesia.

The type figured by Kiener, fig. 595, is even larger than the size given in Lamarck's description—which is, length one and a quarter inches. I have some doubt whether the shell usually identified with *T. crocata*, and which is common enough in cabinets, is really that species, for it is always much smaller and less shouldered—sometimes without any superior angle on the whorls. If this identification is correct, a large synonymy must be added (principally on account of inconstant coloration), including *T. aureolata*, *venustula*, *flavescens*, etc. I prefer to let *crocata* stand as a somewhat doubtful form, and include the others under the name of *T. aureolata*. *T. concinna*, Reeve (fig. 597), is a smaller shell, varying only in the interstices of the revolving ridges being darker colored.

T. pyramidalis, Reeve. Pl. 55, fig. 598.

Yellowish or orange-brown, with a white superior zone. Length, 1·25–1·5 inches.

Isle of Annaa, Paumotus Group.

Garrett obtained a specimen which is white with two orange-yellow bands. The spire is more elegated and less angular than in *T. crocata;* the ribs much more curved and more roughly tuberculated. This is the *aurantia* of Swainson, not Gmelin, and Garrett proposes to revive that name; Gmelin's species being a true *Mitra* and *Turricula* now generally accepted as a distinct genus: in common parlance the Turriculæ, however, will probably continue to be referred to as *Mitræ*, so that some confusion might arise from reinstating *T. aurantia*.

T. AUREOLATA, Swainson. Pl. 55, figs. 600–606.

Orange-brown, with a small white superior zone, and sometimes one or more thread-like inferior bands; sometimes white with an orange band below the suture and another at the base. Length, ·75 inch.

Philippines; Polynesia.

A very variable species in sculpture and coloration, and therefore having a large synonymy. I have already, under *T. crocata*, alluded to the fact that that species has usually been identified with this; it remains to figure the *crocata* of collectors (fig. 600), which is a lemon-yellow variety of *aureolata*, with or without a superior thread-like white band. *T. multicostata*, Swains. (fig. 602), and *T. crocea*, Reeve (fig. 603), are examples of shoulderless varieties of the type and of "*crocata*" respectively; they are both somewhat enlarged in the figures. In *T. venustula*, Reeve (fig. 604), the revolving sculpture is darker colored; and in *T. flavescens*, Reeve (fig. 605), a portion of them are so marked, giving the shell a bright, banded appearance. *T. affinis*, Reeve (fig. 606), is also a synonym.

T. PLICATISSIMA, Schröter. Pl. 55, fig. 607.

Grayish white, apex and base tinged with brown; two dark bands on the body-whorl. Length, 20 mill.

Habitat unknown.

Perhaps a variety of *T. aureolata*.

T. RUBRA, Swainson. Pl. 55, figs. 608, 609.

Light pink and darker banded, or roseate with a light band, sometimes interrupted by dark tints in the interstices of the ribs. Length, ·25 inch.

Paumotus; New Zealand?

The specimens before me, as well as the figures, show that it is not an adult shell. Sowerby's fig. 393 (fig. 608) represents the shell described by Garrett as *T. exquisita;* it is at most, a mere variety.

T. BICOLOR, Garrett.

An unfigured species, cinereous with two rose-colored bands. Length, 8 mill.

Samoa and *Paumotus Isles.*

Appears to be closely allied to *T. rubra.*

T. PALIGERA, Sowb. Pl. 55, fig. 610.

Yellowish white, interruptedly fasciate with chestnut.
Length, ·65 inch.

Hab. unknown.

T. INFAUSTA, Reeve. Pl. 55, fig. 576.

Fleshy straw-color, stained with chestnut. Length, ·63 inch.

Isl. of Ticao, Philippines.

T. GARRETTII, G. and H. Nevill.

Name proposed for *Mitra assimilis*, Garrett, not Pease; an unfigured species, of a whitish color, with closely set, slightly raised deep brown lines.

Cook's, Samoa, and Viti Islands.

T. FORTIPLICATA, Pease. Pl. 55, fig. 577.

Light chestnut, base and apex whitish. Length, 8 mill.

Paumotus Is., in beach sand.

T. EMILIÆ, Schmeltz. Pl. 55, fig. 578.

Reddish chestnut, encircled by two or three narrow yellowish bands. Length, 8 mill.

Paumotus Is., in beach sand.

Described by Mr. Pease as *T. plicatula*, a name preoccupied for a fossil species.

T. ROSEA, Swainson. Pl. 55, fig. 579.

Purple-rose, tipped with white on the ribs; sometimes with a row of dark spots between the ribs and below the shoulder.
Length, ·5 inch.

Lord Hood's Island.

T. DISCOLORIA, Reeve. Pl. 55, fig. 580.

Alternately banded with white and orange or reddish brown, or chocolate. Usually the bands are much darker in color between the ribs. Length, ·5–·65 inch.

Solomon Is. (Brazier); *Philippines* (Paetel); *Viti Is.* (Garrett).

T. AMABILIS, Reeve. Pl. 56, fig. 611.

Ashy or pinkish gray, with a broad white superior band, and sometimes narrow white revolving lines below it.
Length, ·35–·4 inch.

Red Sea; Philippines; Polynesia.

A coral reef species, widely distributed.

T. NICOBARICA, Frauenfeld. Pl. 56, fig. 612.

Shell chocolate-brown, aperture also chocolate. H., 16 mill.

Nicobar Isles.

T. FICULINA, Lam. Pl. 56, figs. 613–615.

Dark chocolate-brown, more or less shouldered and distantly longitudinally ribbed, sometimes crossed by revolving striæ, which become more distinct towards the base; aperture chocolate within. Length, ·7 inch.

Philippines; Solomon Is.; Australia; Galapagos Is.

I refer to this species *T. gausapata*, Reeve (fig. 614), from the Galapagos, and *T. forticostata*, Reeve (fig. 615); the latter without revolving sculpture except at the base.

T. ZEBRINA, d'Orb. Pl. 56, figs. 630, 616.

Smooth, dark chocolate with white longitudinal strigations. Length, 10–12 mill.

Canary Islands.

The type figured (fig. 630), is a narrower form than that depicted by Sowerby; the latter corresponds very well, however, with a specimen before me, which I feel confident belongs to this species.

T. SEMEN, Reeve. Pl. 56, fig. 618.

Smooth; yellowish white and chestnut-brown in alternate longitudinal narrow waved lines. Length, ·5 inch.

Philippines; Polynesia: Sandwich Isles.

I add the localities following the Philippines, believing that *T. flammulata*, Pease, and *T. zebrina*, Garrett, both unfigured, will prove to be synonymous with *T. semen*. It seems to be closely allied to the typical form of *T. zebrina*, d'Orb., in coloring and shape.

T. PUTILLUS, Pease. Pl. 56, fig. 617.

Finely granulated by decussating lines; dark chocolate, with a narrow white superior band; sometimes with a few white spots on the upper half of the shell. Length, ·4 inch.

Paumotus and Society Islands.

T. TRUNCULUS, Sowb. Pl. 56, fig. 619.

Polished, ventricose, chestnut-brown. Length, ·25 inch.

Habitat unknown.

Described from a single specimen.

T. MURICULATA, Lam. Pl. 56, fig. 620.

Orange yellow to dark chestnut, the shoulder and tubercles whitish. Length ·65–·8 inch.

Philippines; Mauritius.

T. PATRIARCHALIS, Lam. Pl. 56, figs. 621, 622, 625; Pl. 58, fig. 689.

Nodosely ribbed at shoulder of whorls, ribs becoming evanescent lower down; spirally incised, the striæ becoming stronger towards the base, and occasionally raised into nodules or riblets; above, they cross the ribs. Color varying from light yellow, through orange and red to dark chocolate, the ribs and usually upper part of body-whorl and spire white, the base of the shell with one or more interrupted white bands, or entirely suffused with white. Length, ·6–·75 inch.

Philippines; Viti Islands.

T. tuberosa, Reeve (fig. 622) is the young of this species, and a very immature specimen of it appears to be described and figured by Küster as *T. elegantula* (fig. 625).

T. PORPHYRETICA, Reeve. Pl. 56, fig. 626.

Smooth, plicately ribbed, ribs angular, three or four revolving granulous striæ at base. Ash, chestnut, etc., with a broad white zone around the suture, and narrower ones marking the basal striæ, or entire base white. Length, ·6 inch.

Philippines, Viti and *Samoa Islands.*

Differs from the preceding species in the longitudinal ribs being continuous over the body-whorl, less tuberculate above, closer and narrower, in the want of revolving sculpture except at the base; the coloring is essentially the same, and it may be only a variety of *T. patriarchalis.*

T. OSIDIRIS, Issel. Pl. 56, figs. 627, 628.

White, with a central chestnut or chocolate band.

Length, ·9 inch.

Red Sea.

With longer spire and somewhat different coloring, this is very closely allied to the preceding species; it differs from *T. cadaverosa* by its broader band and want of revolving sculpture, but appears to be intermediate between it and *porphyretica. T. umbonata*, Sowb. (fig. 628), is a synonym.

T. TUMIDA, Reeve. Pl. 56, fig. 629.

Whorls swollen and angulated around the upper part, the angle with a few large nodules; yellowish white, orange or reddish between the nodules and at the base, with a broad central chocolate band. Length, 1·5 inch.

Australia.

So close to the preceding species that I hesitated about separating them. The color is the same, but this shell is wider, and the nodules are less numerous and larger, with a decided shoulder on the whorls.

T. INTERRUPTA, Anton. Pl. 56, fig. 631.

Whitish, with interrupted revolving lines of chestnut-brown, forming a central band, with traces of an inferior one.

Length, ·4 inch.

Habitat unknown.

Evidently immature. Not included in the genus by either Reeve or Sowerby, and I am unacquainted with it.

T. NODULOSA, Pease. Pl. 56, fig. 632.

White, interruptedly encircled with brown below.

Length, 10 mill.

Paumotus.

Appears to be very closely allied to, if not identical with *T. interrupta*, Anton.

T. ENCAUSTA, Gould. Pl. 56, fig. 633.

Ash-colored, with eight or nine coarse longitudinal ribs, and deeply incised, regular revolving striæ of a dusky color.

Length, ·35 inch.

Fiji Islands.

A young shell, the affinities of which I cannot make out, neither from the original figure and description, nor from an authentic specimen before me.

T. SPECIOSA, Reeve. Pl. 56, fig. 634.

Pinkish white, with a central reddish-brown band, appearing only on the tops of the regular longitudinal ribs; a row of spots above, and another below it; aperture pink within.

Length, ·7 inch.

Philippines, Mauritius, Cook's and Paumotus Is.

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T. PUSIO, Philippi.

Longitudinally costate, nodulous above, granular at base, with revolving impressed striæ; white, with a narrow chestnut central band interrupted by the ribs. Length, ·35 inch.

Hab. unknown.

An unfigured species, omitted by the iconographers, and unknown to me except by the short description.

T. VARIATA, Reeve. Pl. 56, fig. 635.

Yellowish brown with a dark superior band, and a white band with dark margins below the middle. Length, ·7 inch.

Paumotus and *Viti Islands*, coral reefs.

Animal light brown, spotted with yellowish white. *T. fratercula*, Garrett, is a synonym.

T. DISCORS, Grandidier. Pl. 56, figs. 636, 637.

Spire and upper half of the body-whorl lilac or yellowish white, periphery with a narrow white band, lower half of body-whorl chestnut-brown. Length, ·6 inch.

Caroline Islands (Pease).

I unite with this species *T. glabra*, Pease (not Swains.), changed by Pease to *T. lubrica* (fig. 637). The original description in Küster has no locality, and the figure is poor, though recognizable.

T. NODOSA, Swainson. Pl. 56, figs. 638–641.

White, sometimes with a central brown band or row of spots interrupted by the tubercles, which cover the entire surface; upper part of body-whorl with close impressed revolving striæ; aperture yellowish within. Length, ·6–·75 inch.

Red Sea, Philippines, China, Polynesia, Mauritius.

Mr. Garrett mentions a variety occurring at the Paumotus, having a slate-colored band articulated with orange-yellow. I unite with this species *M. tuberculata*, Kiener, *M. fraga*, Kiener (fig. 640), not Quoy, *M. pinguis*, Reeve (fig. 641), which is a juvenile, and *M. cancellarioides*, Anton.

T. TUSA, Reeve. Pl. 56, fig. 642.

Spire and upper portion of body-whorl white, with occasional brown spots, lower portion of body-whorl brown.

Length, ·4 inch. *Philippines to Sandwich Is.; Red Sea.*

Animal greenish white, marbled with chocolate-brown.

T. SEMITICA, Jickeli. Pl. 56, fig. 623.

Gray, lower half of body-whorl ferruginous. Length, 16 mill.

Red Sea.

I only know this species through the original description and figure.

T. FESTA, Reeve. Pl. 56, fig. 624.

White, with a broad central brown band. Length, ·5 inch.

Philippines.

Closely allied to, or perhaps synonymous with *T. tusa*, Reeve.

T. PUPULA, Dunker. Pl. 57, fig. 643.

Reddish brown, with a white superior band, appearing on the spire. Length, ·25 inch.

Somoan Islands.

Figured from an authentic specimen, received from the Godeffroy Museum.

T. ELEGANTULA, Dunker.

Small, white maculated with reddish brown, forming a tessellated series on the last whorl; spire elate, whorls slightly angulated; plicated, the interstices with revolving striæ.

Length, 15 mill.

Samoan Islands.

Has not been figured and the specimen before me is too immature for illustration.

T. TRICOLOR, Gmelin. Pl. 57, figs. 644–646, 651.

Spire and upper portion of body-whorl distantly ribbed, sometimes smooth; yellowish to chocolate, with a white band, and frequently maculated with red-brown or chocolate across or on either border of the band; occasionally a second maculated band near the base. Length, ·25–·35 inch.

Mediterranean Sea.

A very variable little shell, of which *T. Savignii*, Payr. (fig. 644), may be considered the typical ribbed form, and *T. picta*, Sandri, *T. granum*, Forbes (fig. 645), and *T. littoralis*, Forbes (fig. 646), smooth varieties. To these must be added a costate variety recently described by Issel, as var. *pallida* (fig. 651). *M. Lowei*, Dohrn, an unfigured species, from the Canary Islands, is probably a synonym.

T. SEMICOSTATA, Anton.

Chestnut-brown, blotched with white on the spire.
Length, ·5 inch.

Habitat unknown.

The sculpture appears to be different from that of *T. tricolor:* it is a doubtful species.

T. COLUMBELLARIA, Scacchi. Pl. 57, figs. 647, 653.

Yellowish to dark chocolate; revolving striæ becoming obsolete in the middle of the body-whorl; columella with two plaits.
Length, ·25 inch.

Mediterranean Sea.

Referred by some authors to the genus *Columbella.* The synonyms are *T. obsoleta*, Phil.; *T. olivoidea*, Cantraine; *T. clandestina*, Forbes (fig. 647); *T. leontocroma*, Brusina; *T. striatella*, Calcara; *T. Greci*, Phil. (fig. 653), a Sicilian fossil.

Three little Mitras are published by Brusina without figures: *M. columbulæ*, *M. striata*, and *M. typostigma*, all from Dalmatia; they are possibly all referable to this species.

T. SUAVIS, Souverbie. Pl. 57, fig. 648.

Rose-color, with a broad white band margined with chestnut.
Length, 5·5 mill.

New Caledonia.

T. HANLEYI, Dohrn. Pl. 57, fig. 654.

Gray, maculated and banded with chestnut; closely plicate longitudinally, with a median spiral sulcus, tuberculate at base.
Length, 5·5 mill.

Habitat unknown.

Said to resemble *T. Columbellaria*, but distinguished by its sculpture.

T. CORALLINA, Reeve. Pl. 57, fig. 655.

Amber or coral-red, ribs whitish. Length, ·6 inch.

Philippines.

T. PUSILLA, A. Adams. Pl. 57, fig. 649.

Yellowish white, banded above with orange or pink.
Length, ·5 inch.

Habitat unknown.

T. ARTICULATA, Reeve. Pl. 57, fig. 656.

Pale pinkish scarlet, encircled with a small white brown-articulated zone. Length, ·75 inch.

Habitat unknown.

T. ÆMULA, E. A. Smith. Pl. 57, fig. 650.

Blackish brown, with a narrow yellow line round the middle of the whorls, and yellow at the upper margin, and a second line on the last whorl rather below the middle; clothed with an olive epidermis obscuring the coloring; aperture dark-brown with two yellow bands, lirate far within. Length, 12 mill.

Japan.

Undetermined Species of Turricula.

T. PYRAMIDALIS, A. Ad. *Japan.*
T. CASTANEA, HOYTI, INSTRICTA, LÆVICOSTATA, MODICELLA, LUTEOFUSCA, UNILINEATA, of Garrett. *Polynesia.*
T. VIRGINALIS, Lesson. *Tahiti.*
T. SEMIPLICATA, Lam. Adams' Genera. *Hab. unknown.*
T. ELEGANTULA, Dunker. *Samoan Islands.*
T. OLIVACEA, Anton. *California.*
T. RUFOFILOSA, E. A. Smith. *Solomon Islands.*

Genus **CYLINDRA**, Schum.

C. NUCEA, Gronov. Pl. 57, fig. 659.

Smooth, or with obsolete impressed spiral lines towards the base. Yellowish white, with olive-black epidermal revolving lines, partly aggregated into two broad, somewhat interrupted bands; under the epidermis are six or eight spiral rows of minute punctations, of chestnut color, scarcely visible, but showing each a terminal dot on the margin of the lip; aperture smooth, rosy white within. Length, 1·5–2·5 inches.

Polynesia.

The animal is diluted white, foot and siphon margined with dashes of black and white. Reeve gives New Zealand as the locality of the species, which is an error.

C. DACTYLUS, Linn. Pl. 57, figs. 658, 664.

Spire decussated, body-whorl with sometimes a slight shoulder.

Whitish, clouded with chestnut-brown; encircled with distant, narrow, closely punctate, incised brown lines.

Length, 1·25–1·75 inches.

Philippines; Polynesia; sand or sandy mud inside the reefs.

C. obesa, Reeve, is a specimen covered with its greenish epidermis, and *C. Potensis*, Montr. (fig. 661) is a small, more cylindrical variety from New Caledonia.

C. ORNATA, Schuberth and Wagner. Pl. 57, fig. 660.

Thick, white, with close revolving series of red punctæ.

Length, 1·5 inches.

Habitat unknown.

I have copied the poor figure of this species—which has been passed over by both Reeve and Sowerby. Very probably it = *C. dactylus.*

C. CRENULATA, Gmelin. Pl. 57, figs. 662–666.

Cylindrical, with impressed, closely pitted revolving lines; white, with waved clouds of chestnut-brown, frequently disposed in two or more broad interrupted bands of large spots.

Length, 30–40 mill.

Red Sea, Indian Ocean, Mauritius, Philippines, Polynesia.

C. undulosa, Reeve (fig. 664), differs typically in six or eight of the revolving lines being colored, and the form is not quite so cylindrical; it is connected by intermediate stages with *C. crenulata.* In *C. radula*, Sowb. (fig. 665), the form, and in some cases the coloring, of *C. undulosa* are preserved, but the growth-lines are close and deep, decussating the revolving lines and forming numerous little square tubercles at their intersection; this also gradually shades off into the smoother typical form. It is not unlikely that this rough form will be found to be a connecting link in a chain of variations uniting *C. crenulata* with *C. fenestrata.* *C. arctata*, Sowb. (fig. 666), is a variety with more produced spire, and two interrupted brown bands; it is included in the series of specimens before me.

C. SINENSIS, Reeve. Pl. 57, figs. 668, 670.

Brownish white, marked with darker brown or uniform brown; revolving ridges granose. Length, 1·5–1·75 inches.

China.

Distinguished from *C. crenulata* by its elaborate sculpture. *C. lima*, Sowerby (fig. 670) appears to be a smaller specimen of the same species.

C. FENESTRATA, Lam. Pl. 57, figs. 671, 667.

Thick, rudely folded longitudinally, the ribs sometimes almost obsolete; crossed by regular, rather narrow revolving riblets and intervening grooves, the riblets become nodulous on the longitudinal folds; color whitish or yellowish, revolving ribs very dark chocolate usually, sometimes uncolored.

Length, 1–1·25 inches.

Philippines; Polynesia, in sand, inside coral reefs.

C. glans, Reeve (fig. 667) has the revolving ribs uncolored. There can be no doubt of its identity, as in most specimens of *C. fenestrata* a portion of the whorl next the outer lip is precisely like *glans*, and a broken specimen before me has been repaired with the orange-brown color characteristic of *glans*.

C. PUNCTATA, Swainson. Pl. 57, fig. 669.

Olive-brown, whorls encircled with engraved, punctate striæ. Length, 1·25 inches.

Habitat unknown.

This shell is unknown in collections.

C. NUX, Sowb. Pl. 57, fig. 657.

Orange or chestnut-brown, closely lineated by incised, minutely punctured lines and irregularly spotted and clouded with white: aperture chestnut within. Length, ·75 inch.

Habitat unknown.

Mr. Sowerby has figured but not described this species; it appears to be distinct, and a very good specimen is included in the Swift Collection in the Museum of the Philadelphia Academy.

Genus **IMBRICARIA**, Schumacher.

Distinguished by its Conus-like shells, the columella with less numerous plications than most of the species of *Cylindra*. The transition between this genus and the latter is gradual, some of the species placed in *Cylindra*, such as *C. dactylus*, being almost cone-shaped.

I. CONICA, Schumacher. Pl. 58, fig. 673.

Yellowish or ash-color in darker and lighter clouds, encircled by equidistant narrow brown lines, and mottled by quadrangular white spots. Length, 1 inch.

Philippines; Polynesia.

Gregarious in sand in sheltered places inside the reefs. It is the *Mitra marmorata* of Schuberth and Wagner, and the type of Swainson's genus *Conœlix*.

I. CROUANI, Crosse. Pl. 58, fig. 674.

Violet flesh-color, with irregular longitudinal whitish streaks; smooth. Length, 15 mill.

Galapagos.

I. CONULUS, Lam. Pl. 58, fig. 672.

Smooth, distantly spirally grooved at the base; yellowish brown, under a thin olivaceous epidermis, with revolving blackish or brownish lines. Length, 1–1·25 inches.

Philippines, in mud at the roots of mango trees.

I. CITRINA, Reeve. Pl. 58, fig. 675.

Smooth spire with rows of small tubercles; orange-brown, stained with livid chestnut. Length, 1·5 inches.

Habitat unknown.

I. CARBONACEA, Hinds. Pl. 58, figs. 676, 677.

Spire smooth, body-whorl with a few engraved revolving lines towards the base; black, with traces of darker revolving lines. Length, ·9 inch.

Cape of Good Hope.

Possibly equivalent to the preceding species. Very probably *I. Rollandi*, Bernardi (fig. 677), described from a somewhat worn specimen, locality unknown, belongs here, although the spire is somewhat different.

I. PUNCTATA, Swainson. Pl. 58, figs. 679–681.

Yellowish white, clouded with a darker shade, apex black; body-whorl encircled with engraved, sometimes minutely punctured lines.

Length, ·5–·8 inch.

Society Islands.

With this species must be united *M. conovula*, Quoy, partly (fig. 681), and *M. ossea*, Reeve, a name given because Swainson had previously given that of *punctata* to a *Mitra; M. truncata*, Kiener (fig. 680), a poorly figured shell, may also be placed here for the present.

I. LINEATA, Swainson. Pl. 58, fig. 678.

Yellowish, smooth, with revolving chestnut hair-like lines.

Length, 1 inch.

Inhabits the South Seas.

This species has not been recognized by the monographers. It is described as smooth, yet I think it is merely a large *punctata*, which it much resembles in the spire and upper part of aperture.

I. VIRGO, Swainson. Pl. 58, fig. 683.

Yellowish white, apex and base tipped with black-violet, spire much depressed, mucronate, upper portion of body-whorl swollen.

Length, ·6 inch.

Polynesia? sand at low water.

Although so bulbous, I cannot help thinking that this will prove to be an extreme variation of *I. punctata.*

I. VANIKORENSIS, Quoy. Pl. 58, figs. 684, 682.

Encircled by closely punctured striæ; ashy, or reddish gray, whitish towards top of body-whorl and on the spire, ornamented with numerous minute white spots and streaks, edged with chestnut; aperture chestnut within. Length, ·65–·9 inch.

Philippines; Polynesia, in sandy mud at low water.

I find no good reason for the separation from this species of *I. Deburghiæ*, Sowb. (fig. 682), recently described from Taheiti.

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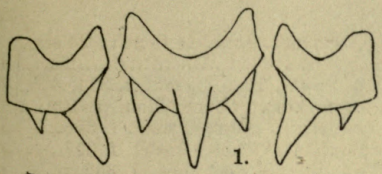
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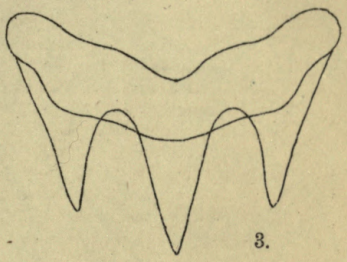
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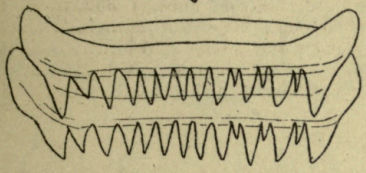
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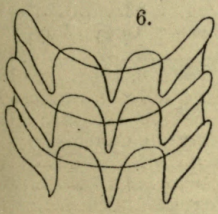
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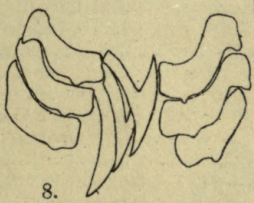
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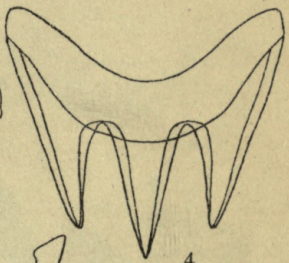
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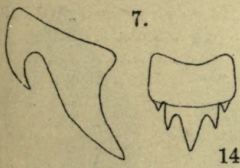
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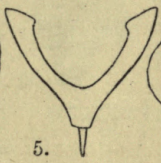
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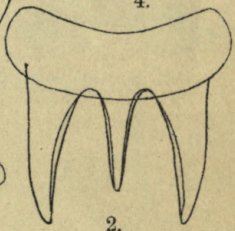
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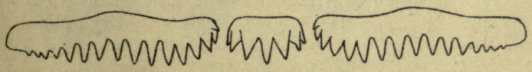
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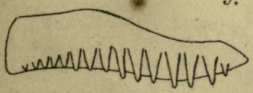

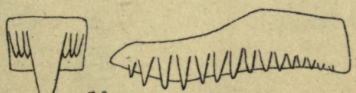
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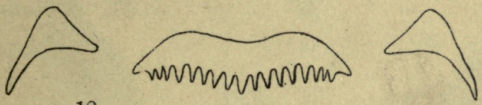
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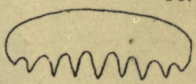
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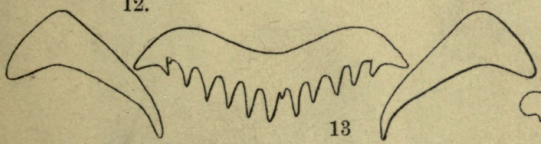
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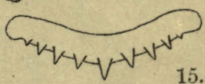
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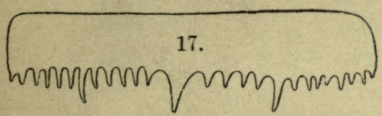
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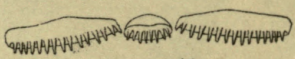
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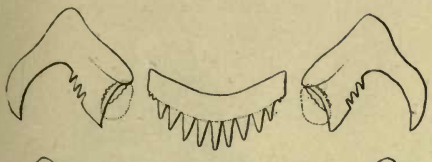
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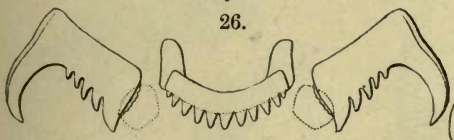
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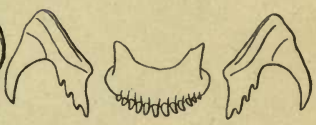
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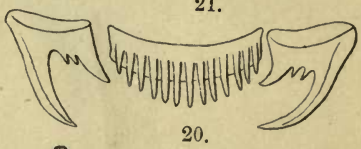
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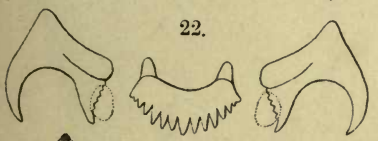
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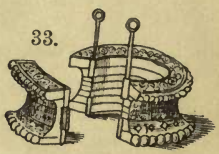
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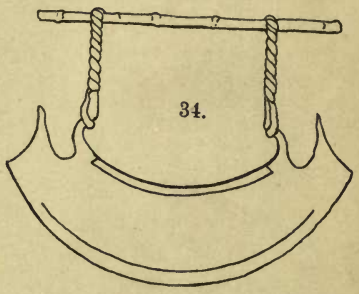
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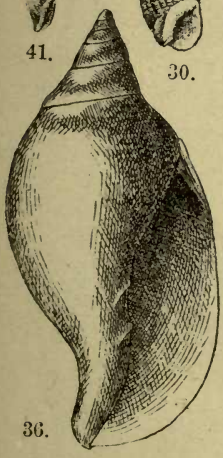
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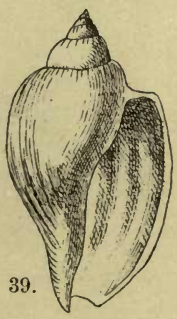
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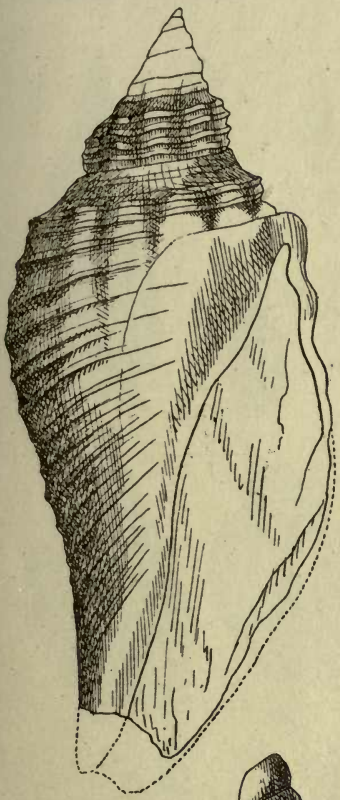

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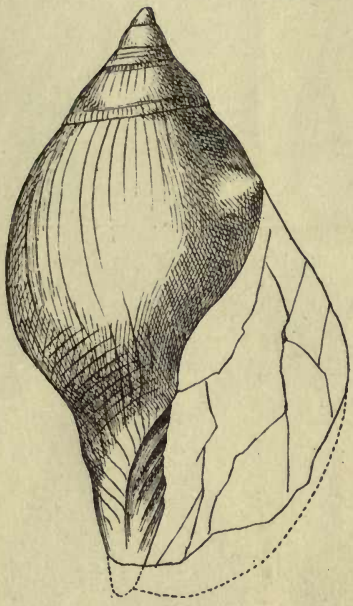

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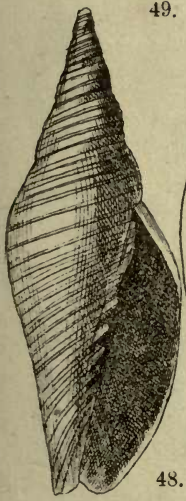

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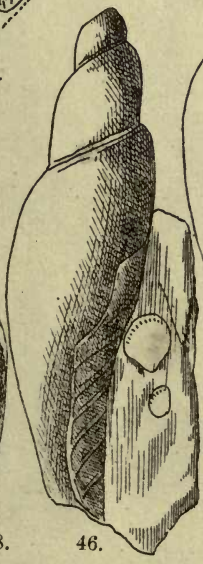

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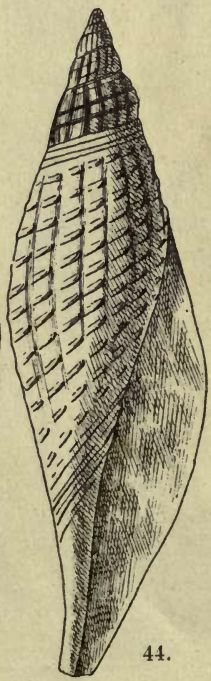

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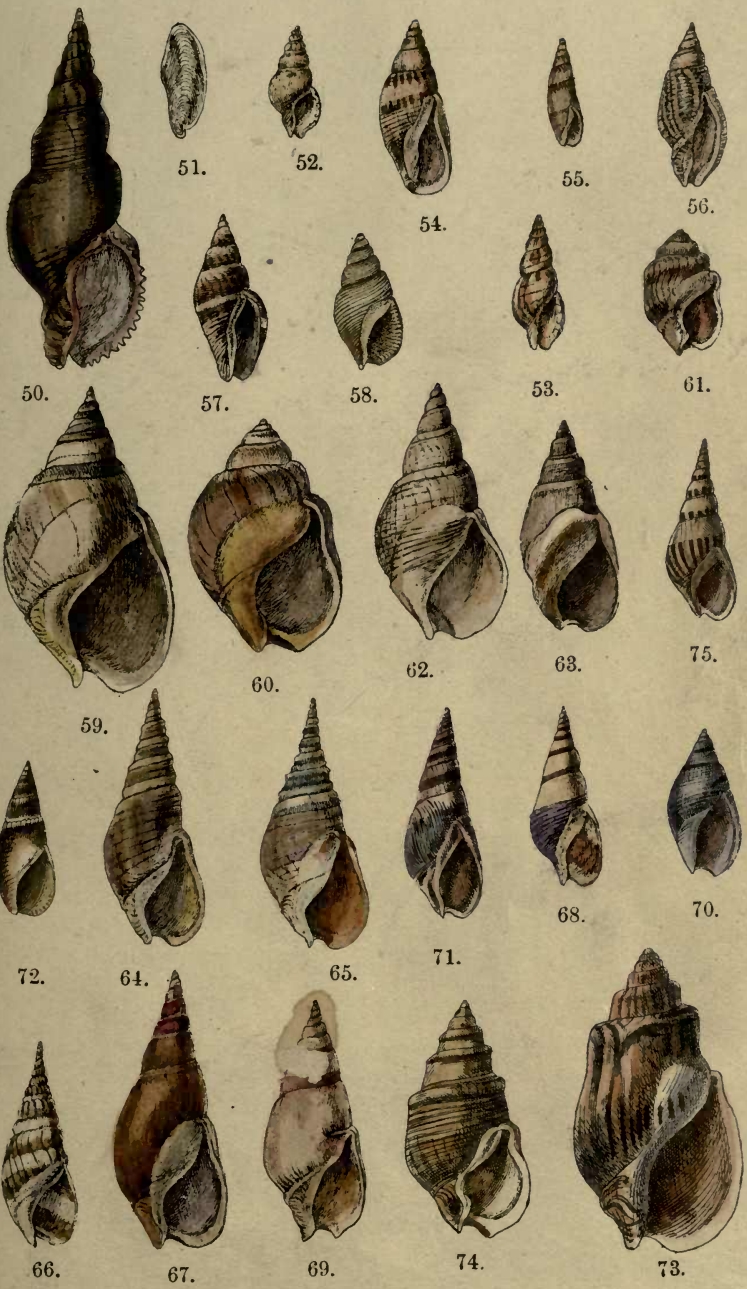
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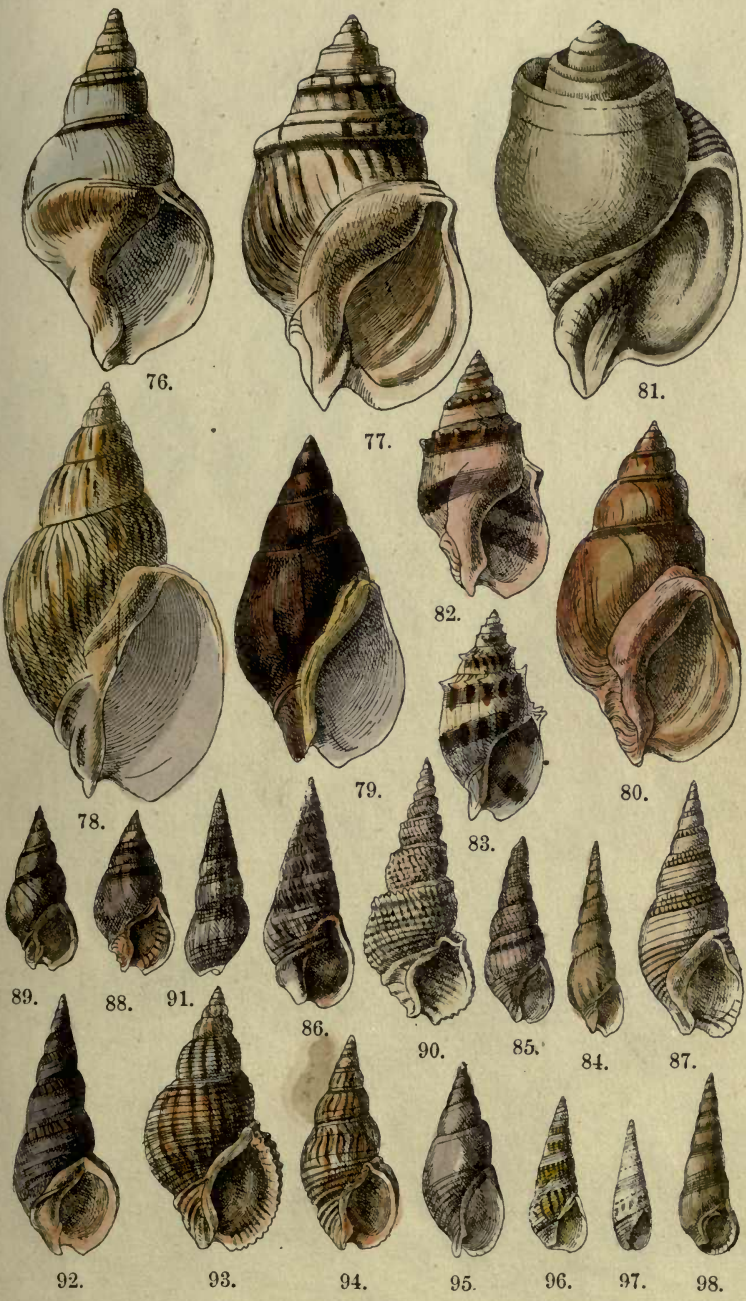
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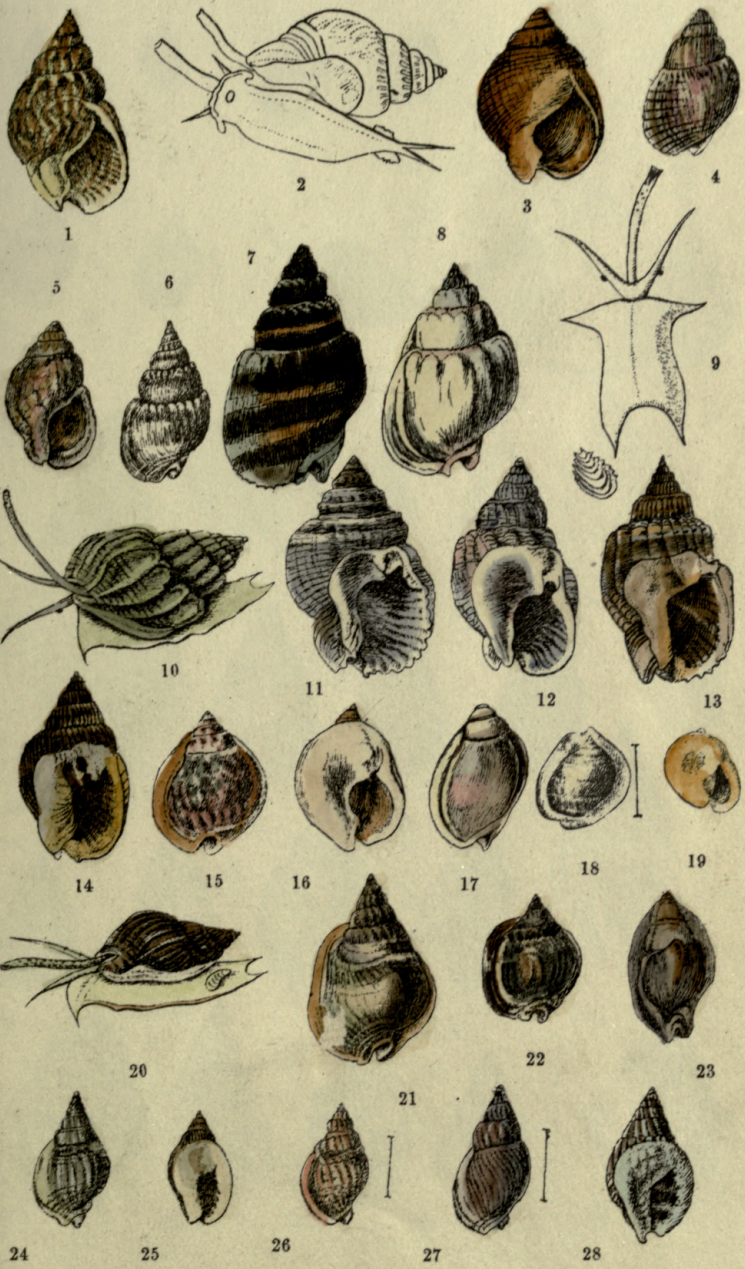
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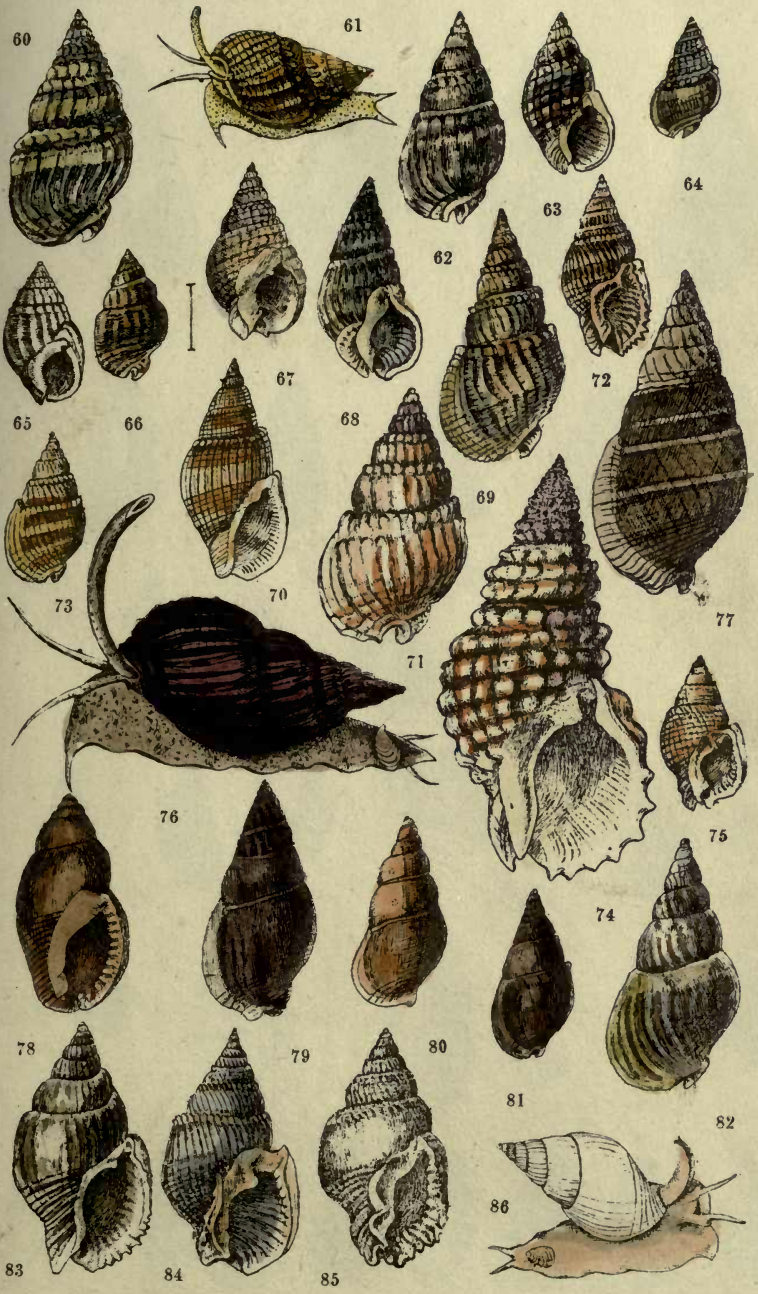
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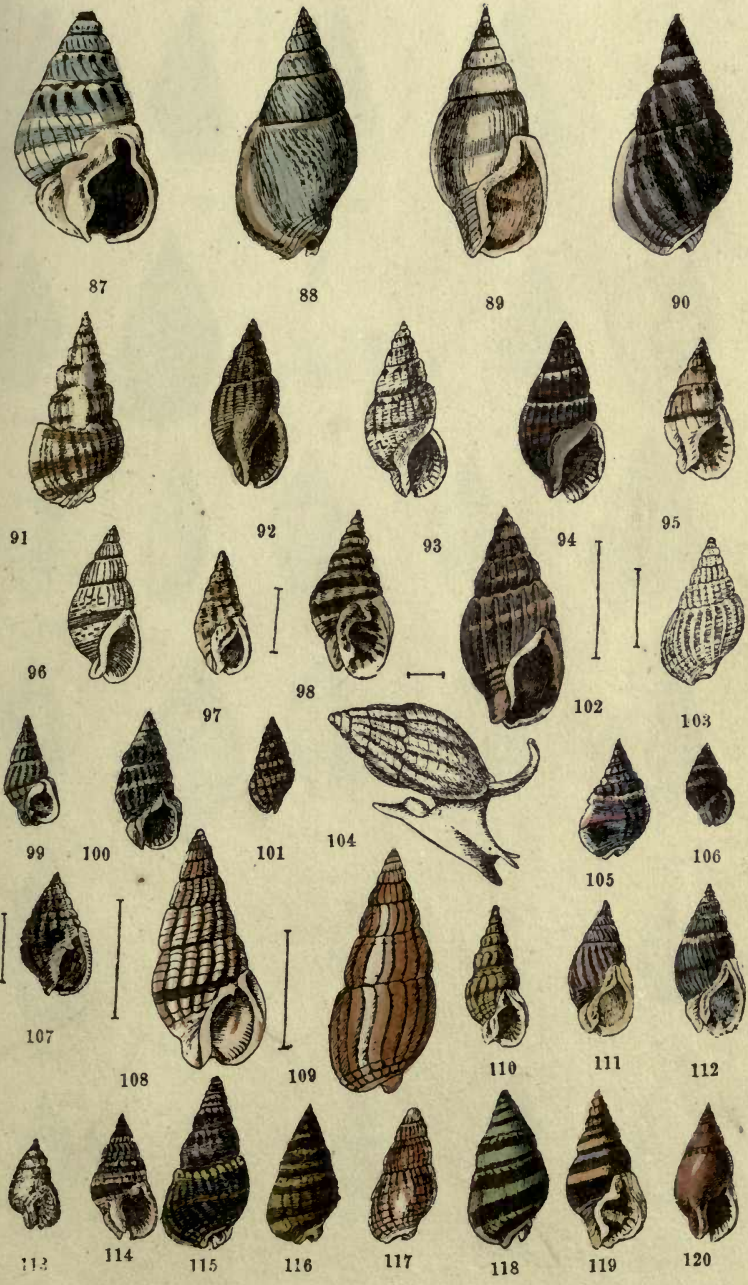
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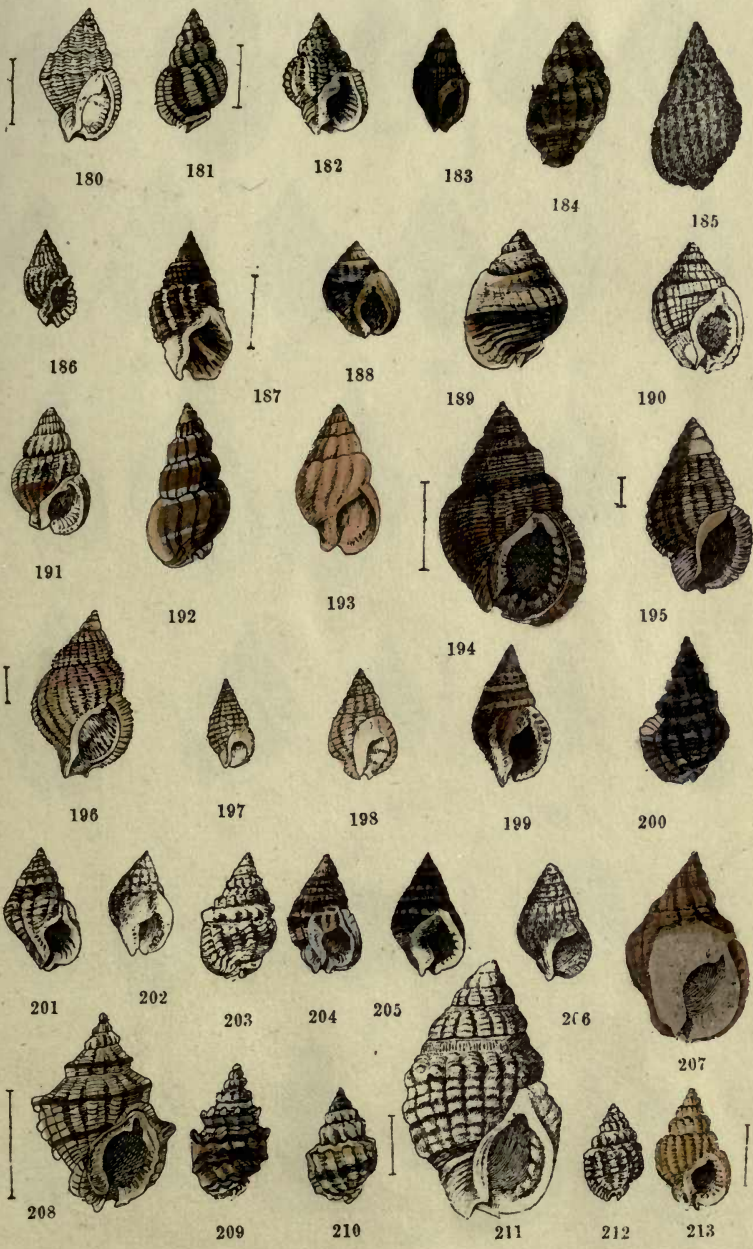
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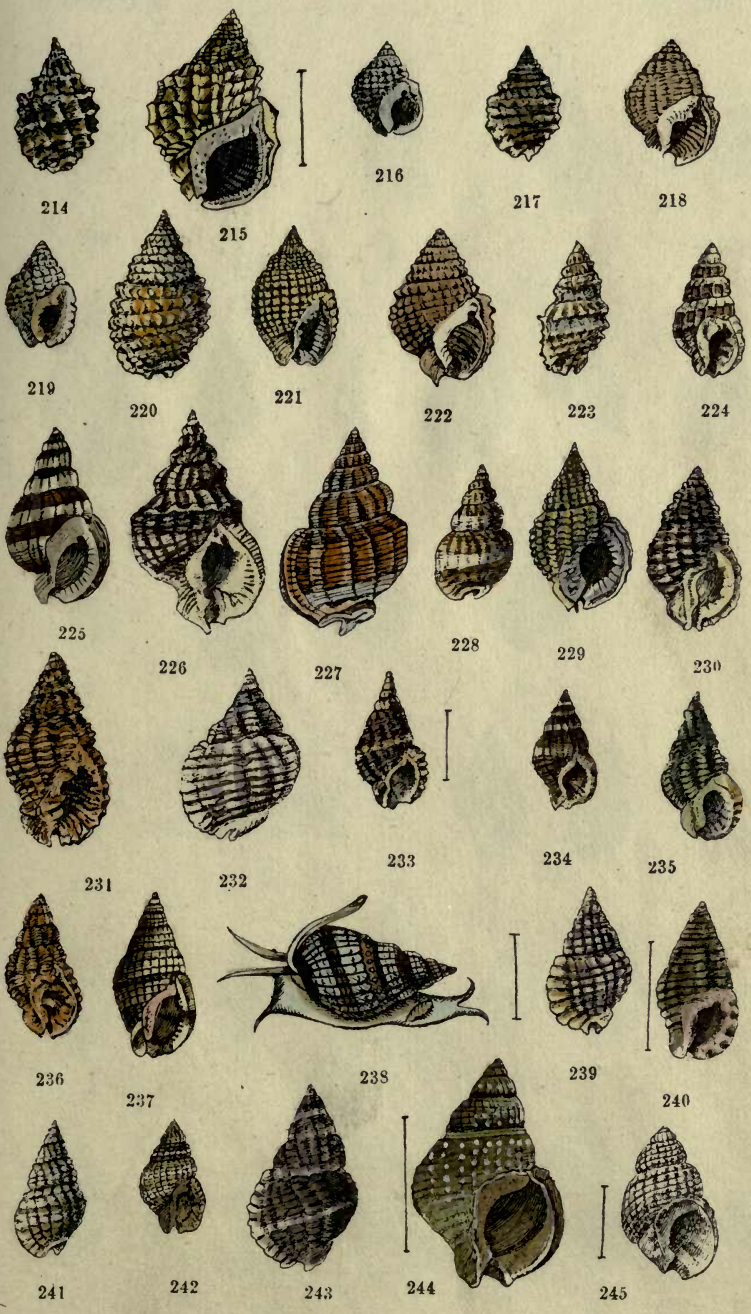
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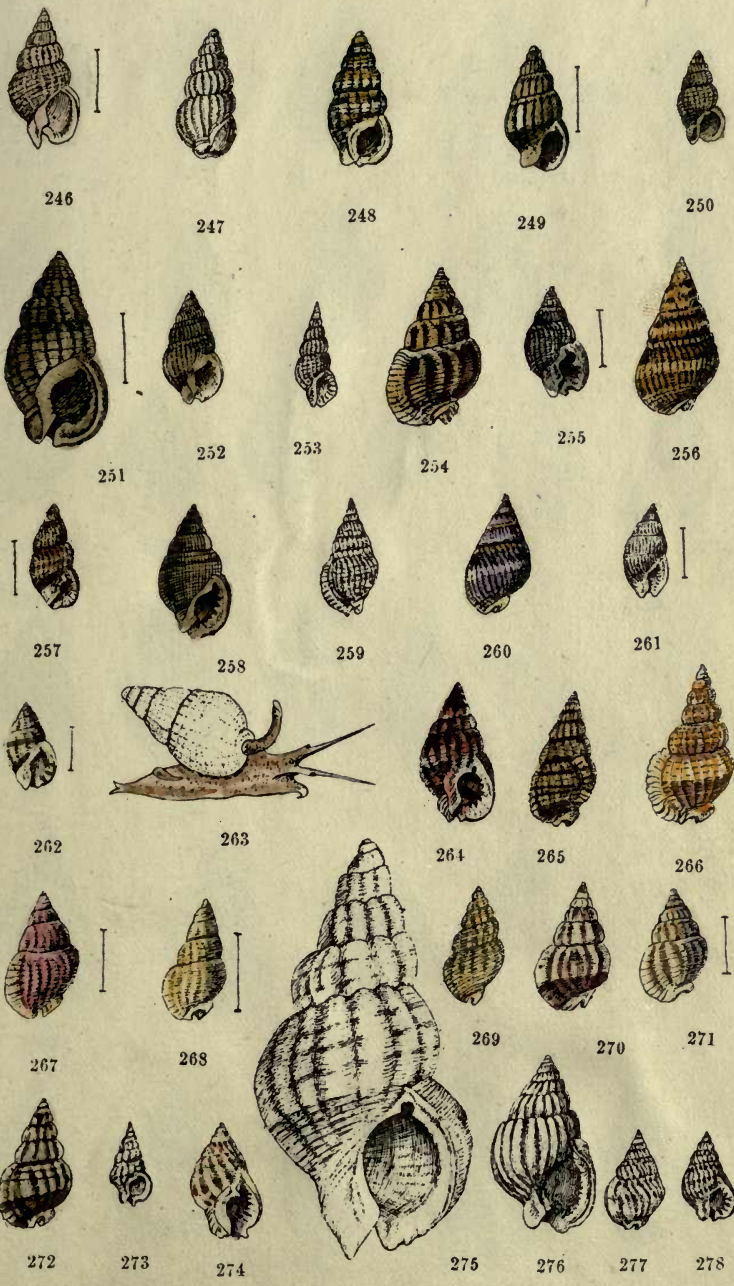
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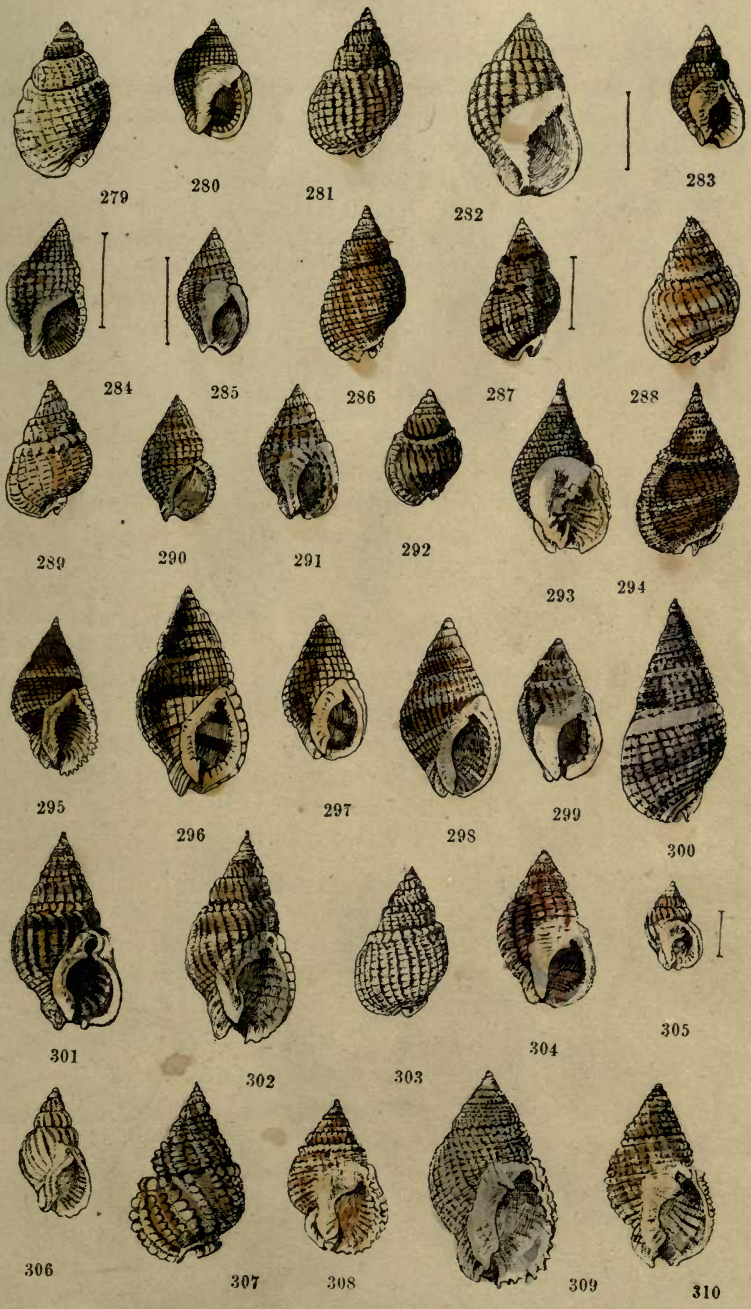
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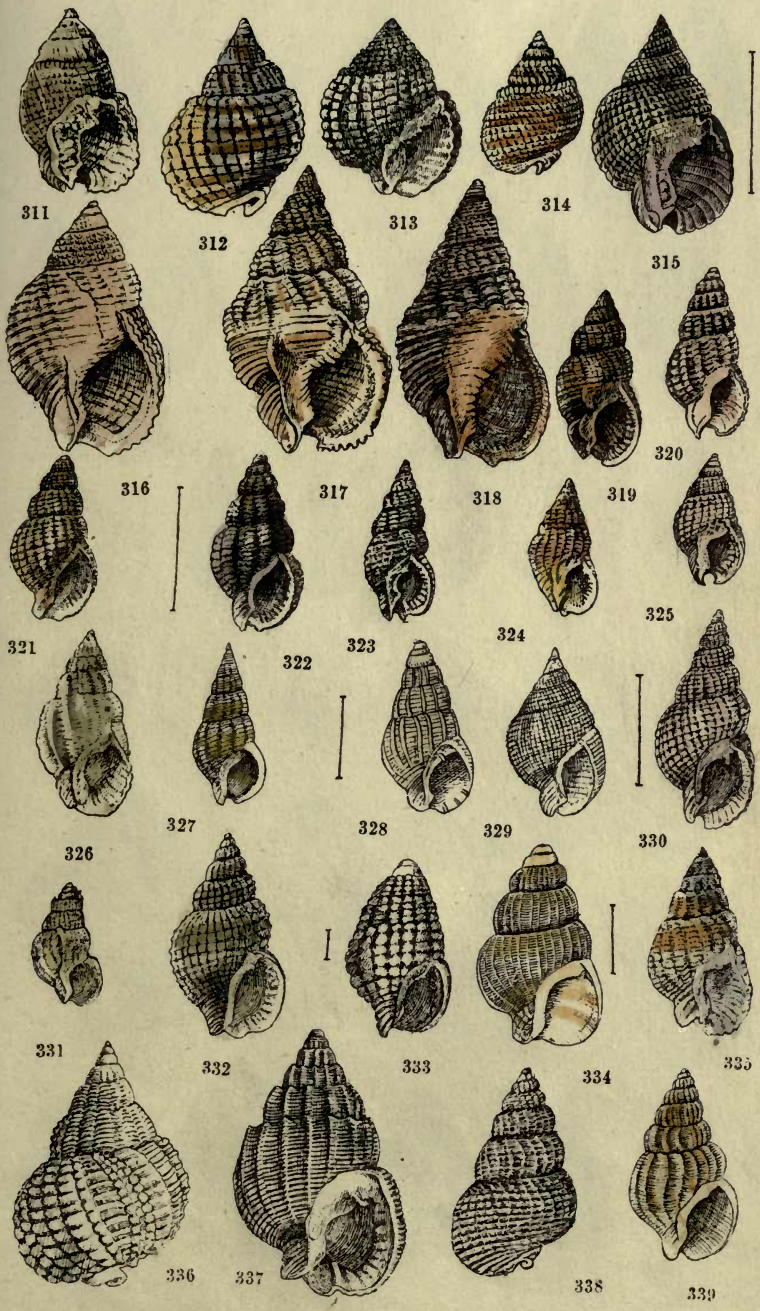
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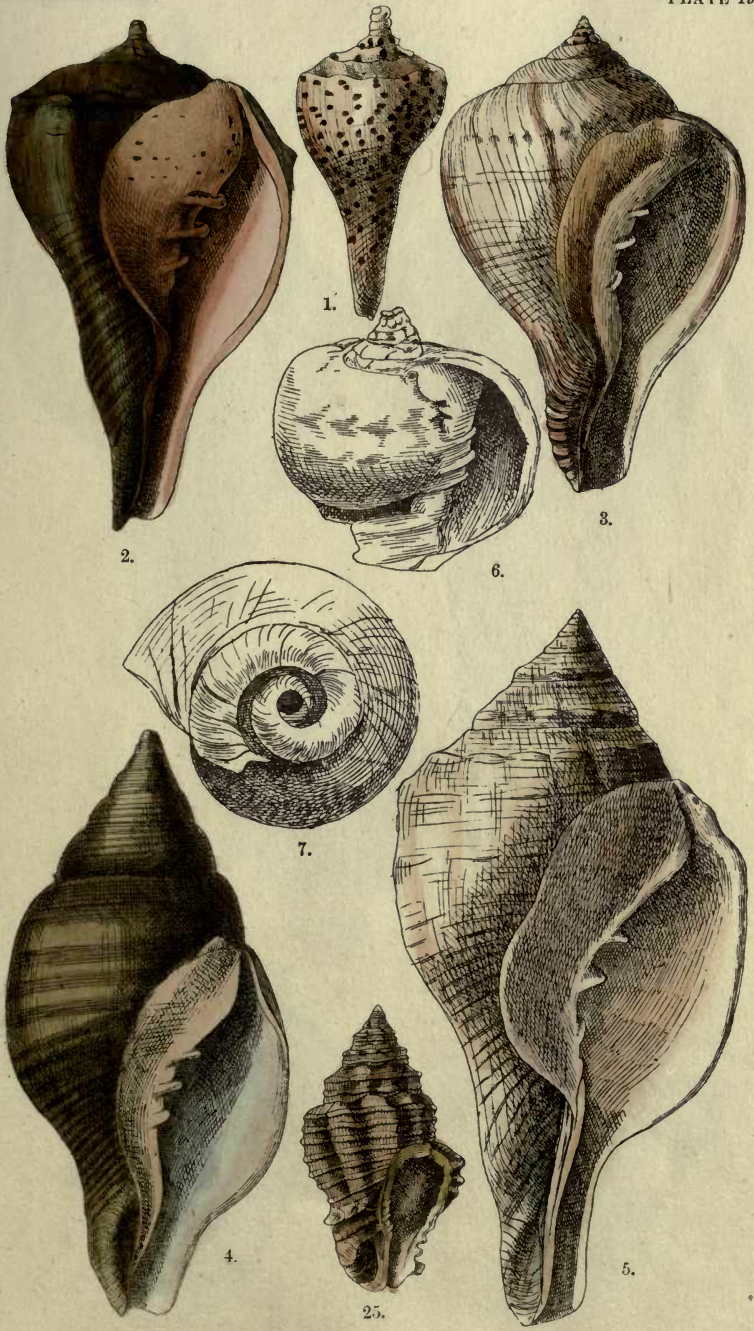
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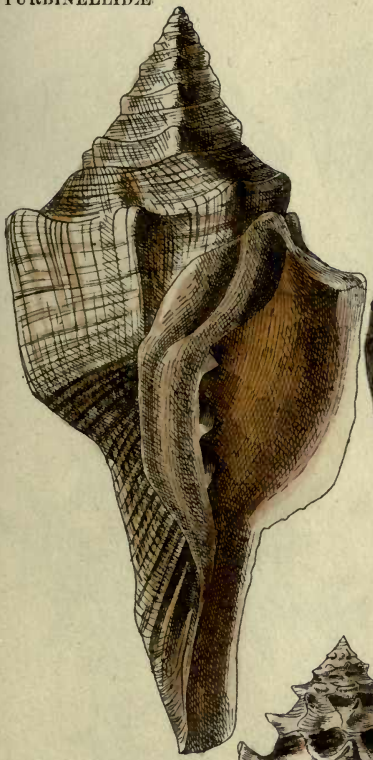

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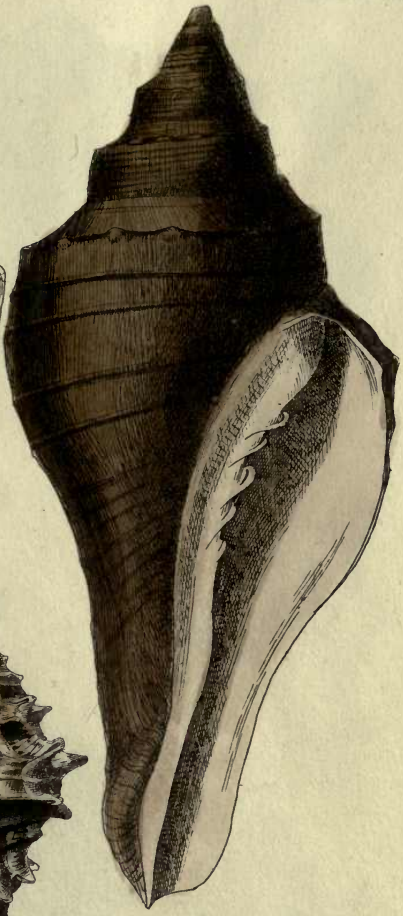

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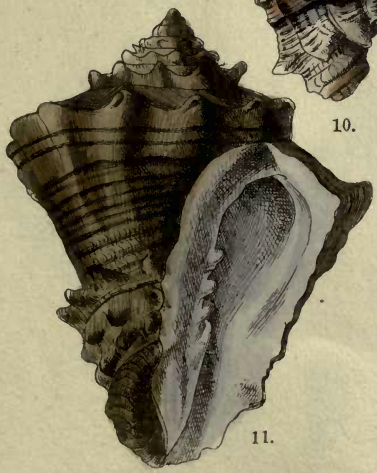

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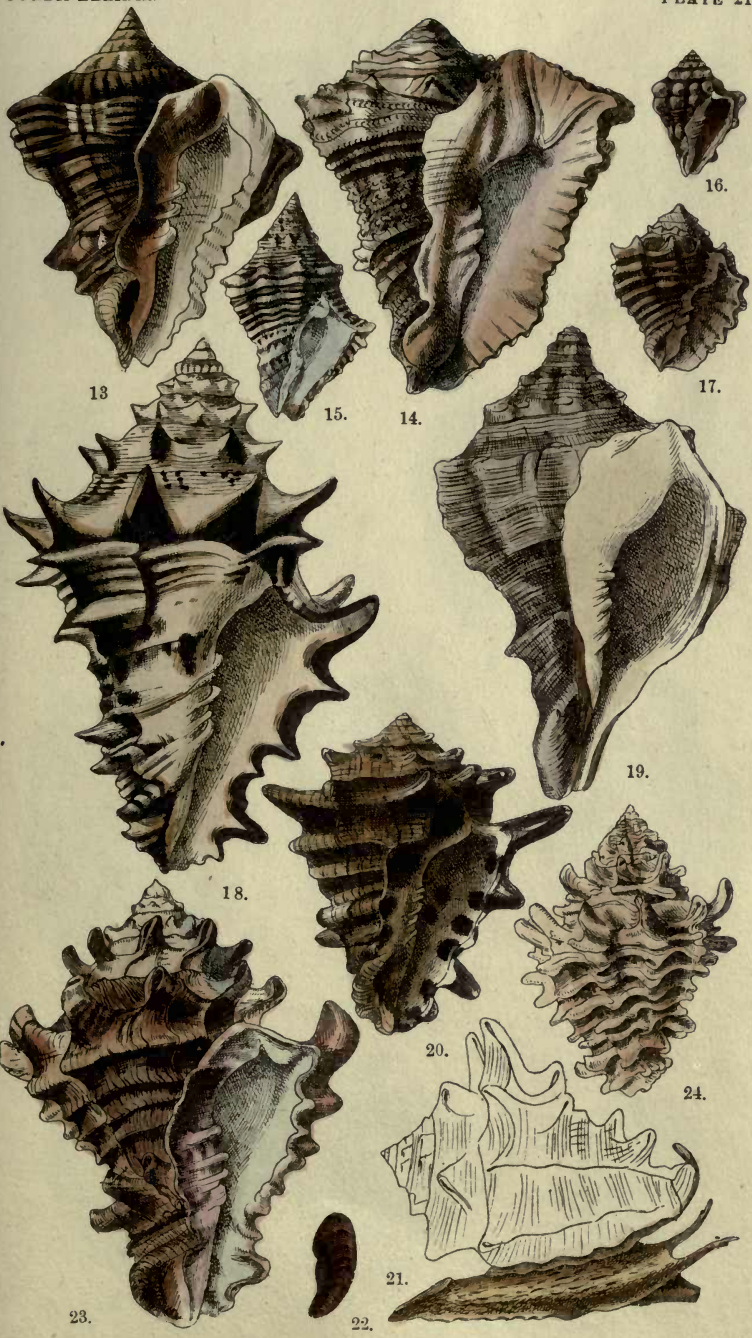
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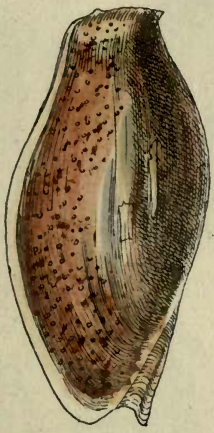

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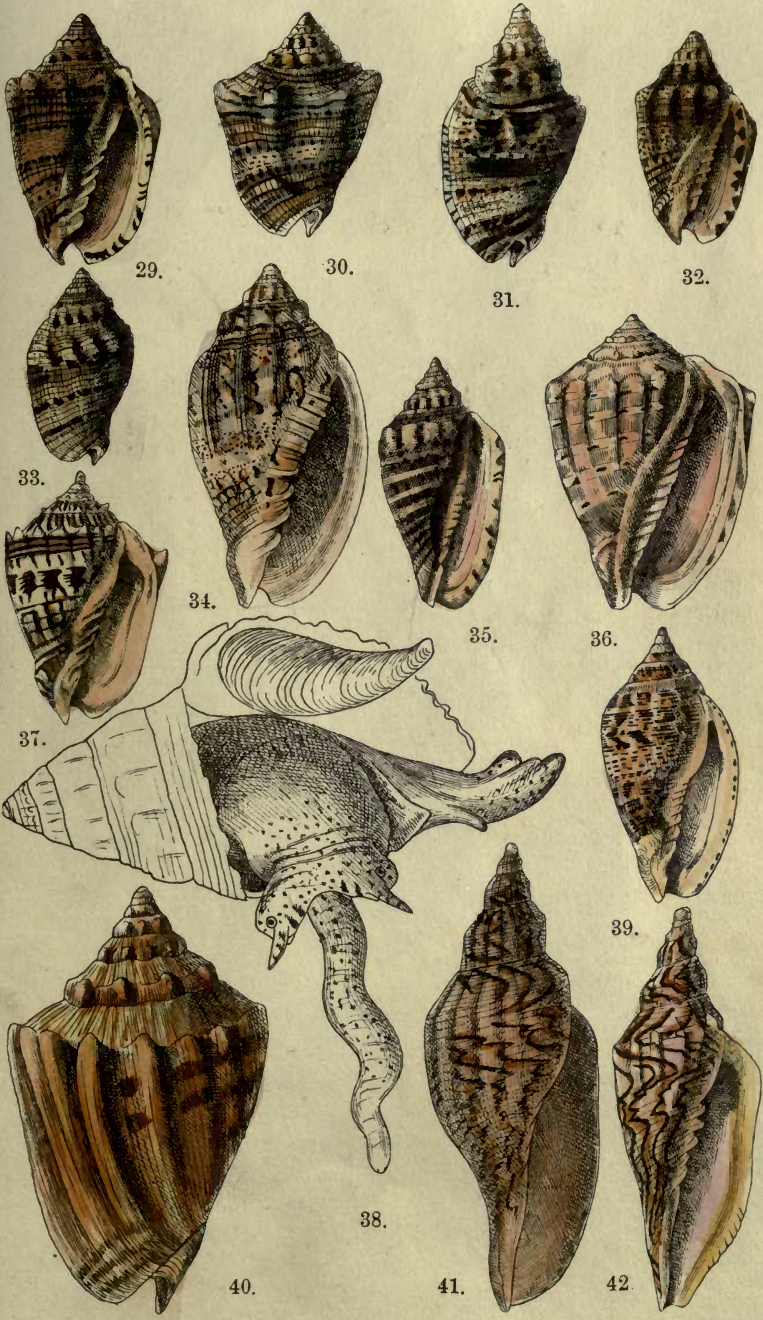
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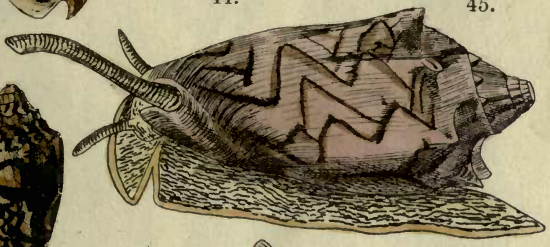
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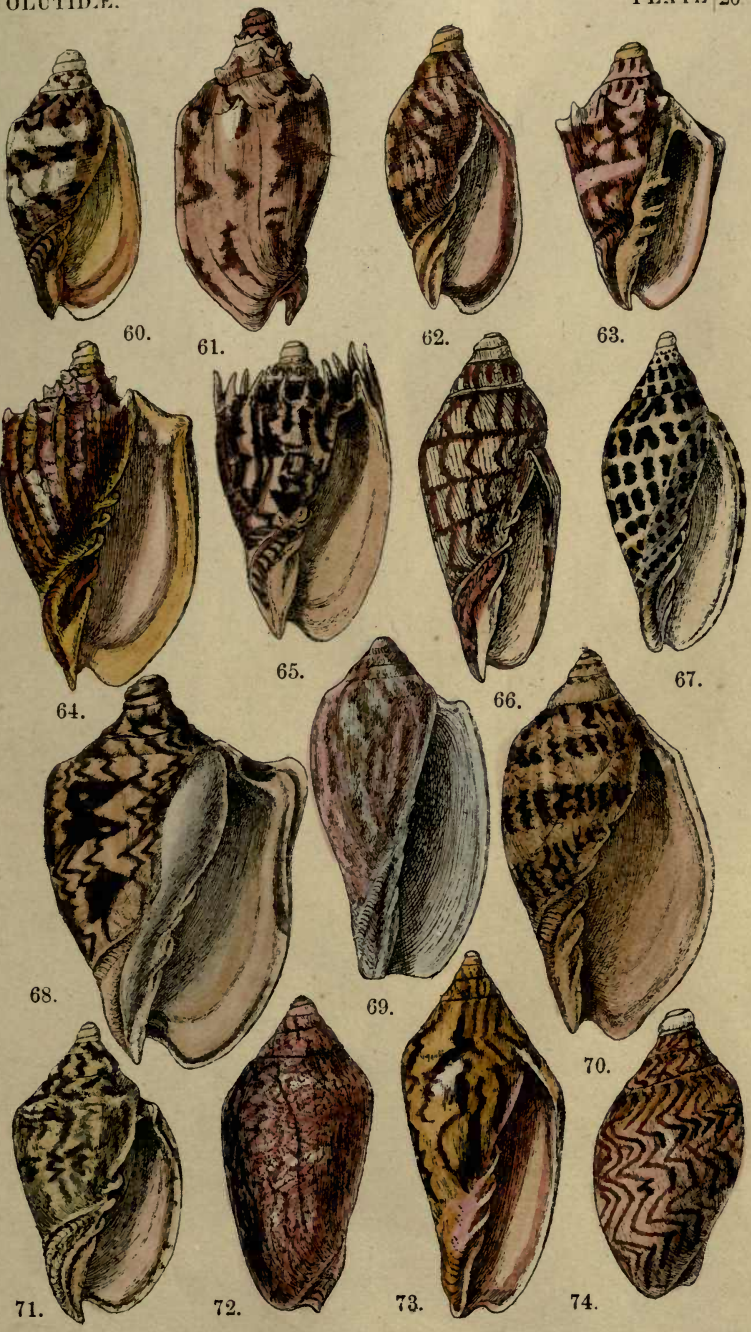
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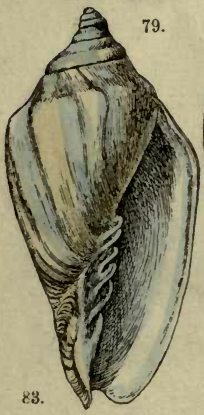

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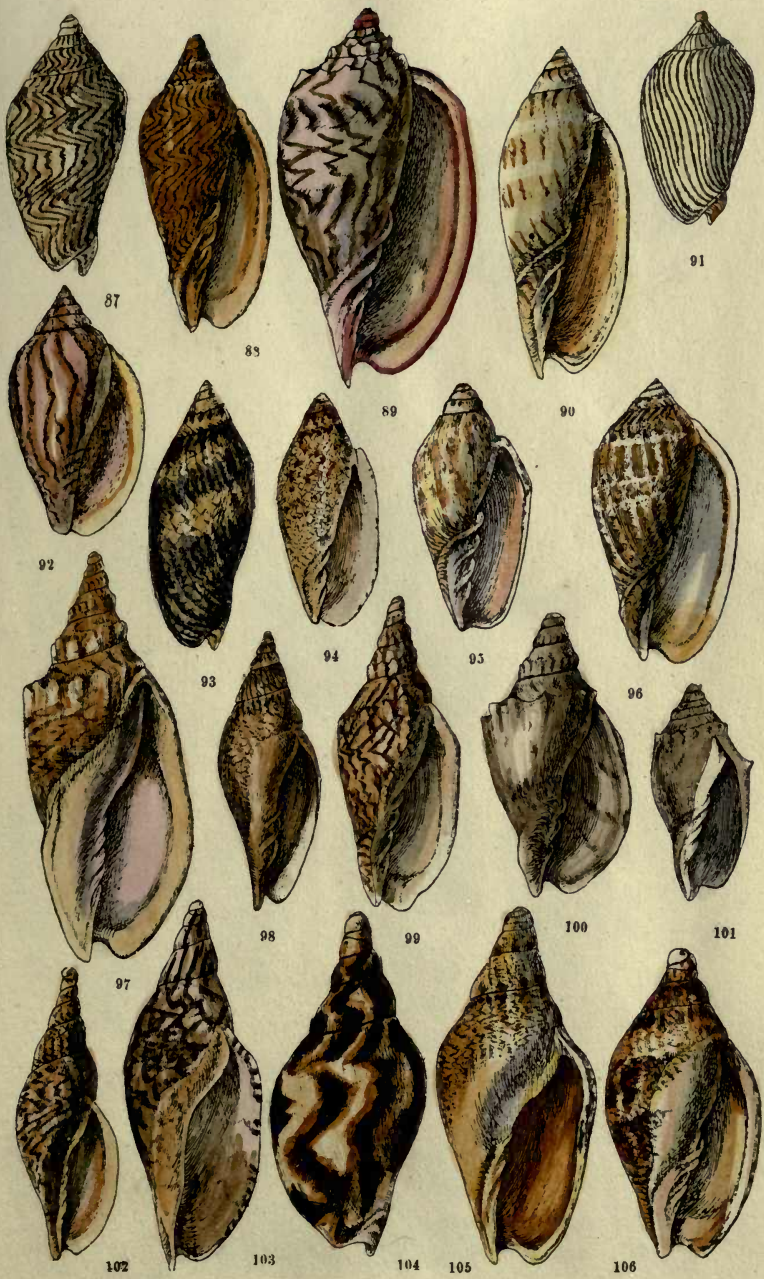
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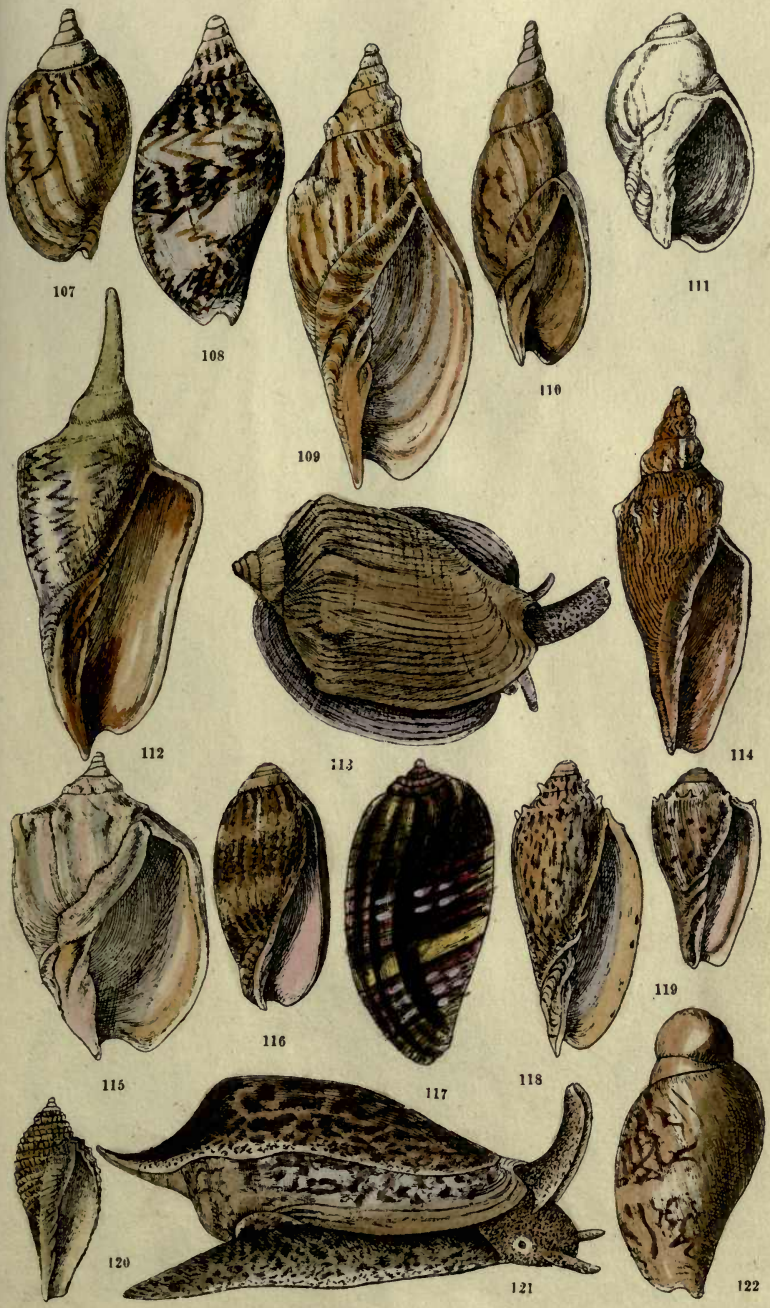
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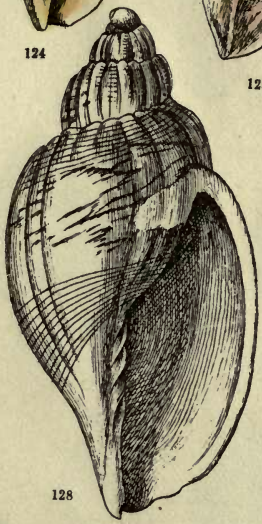

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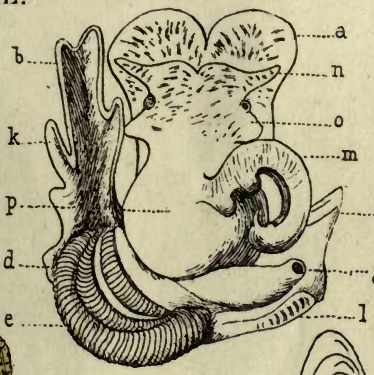

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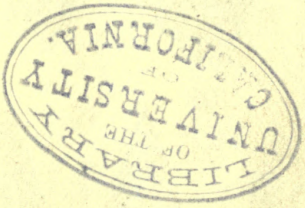
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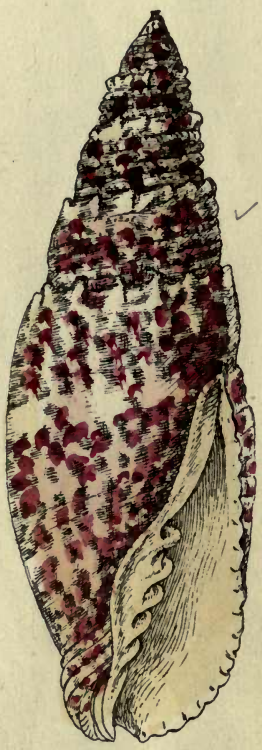

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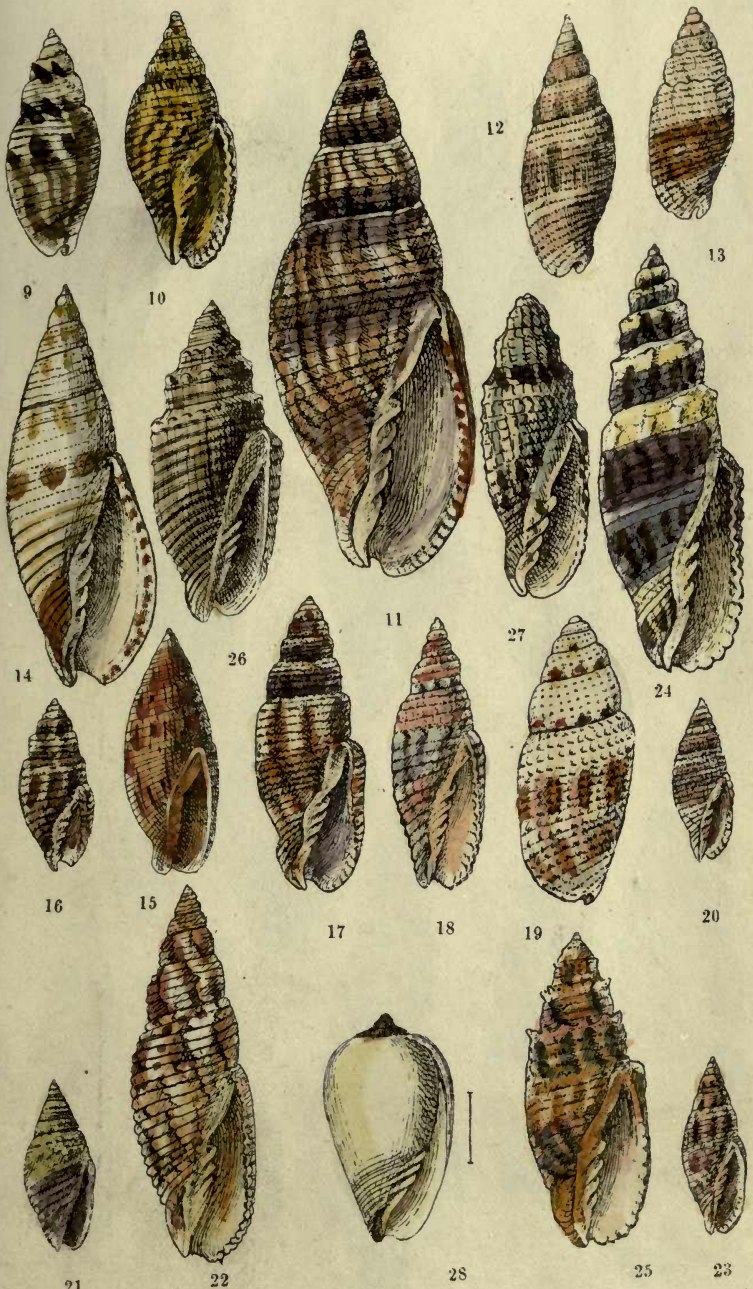
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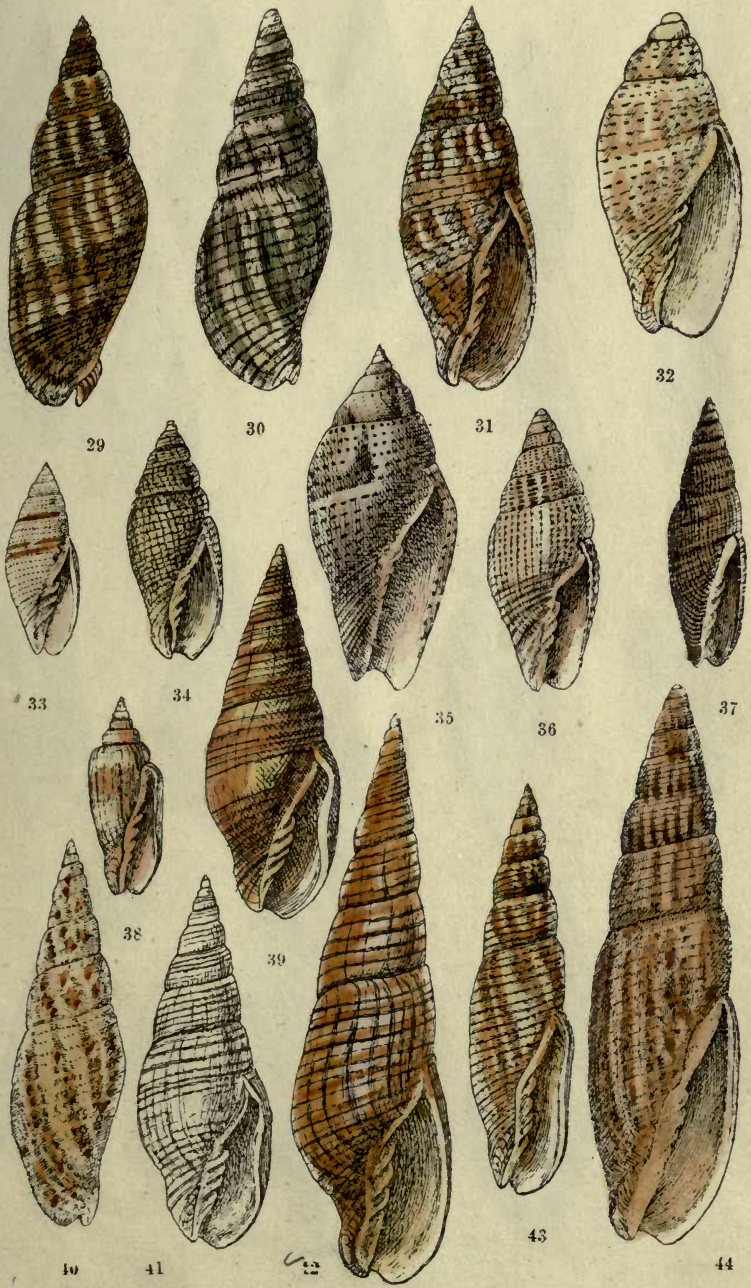
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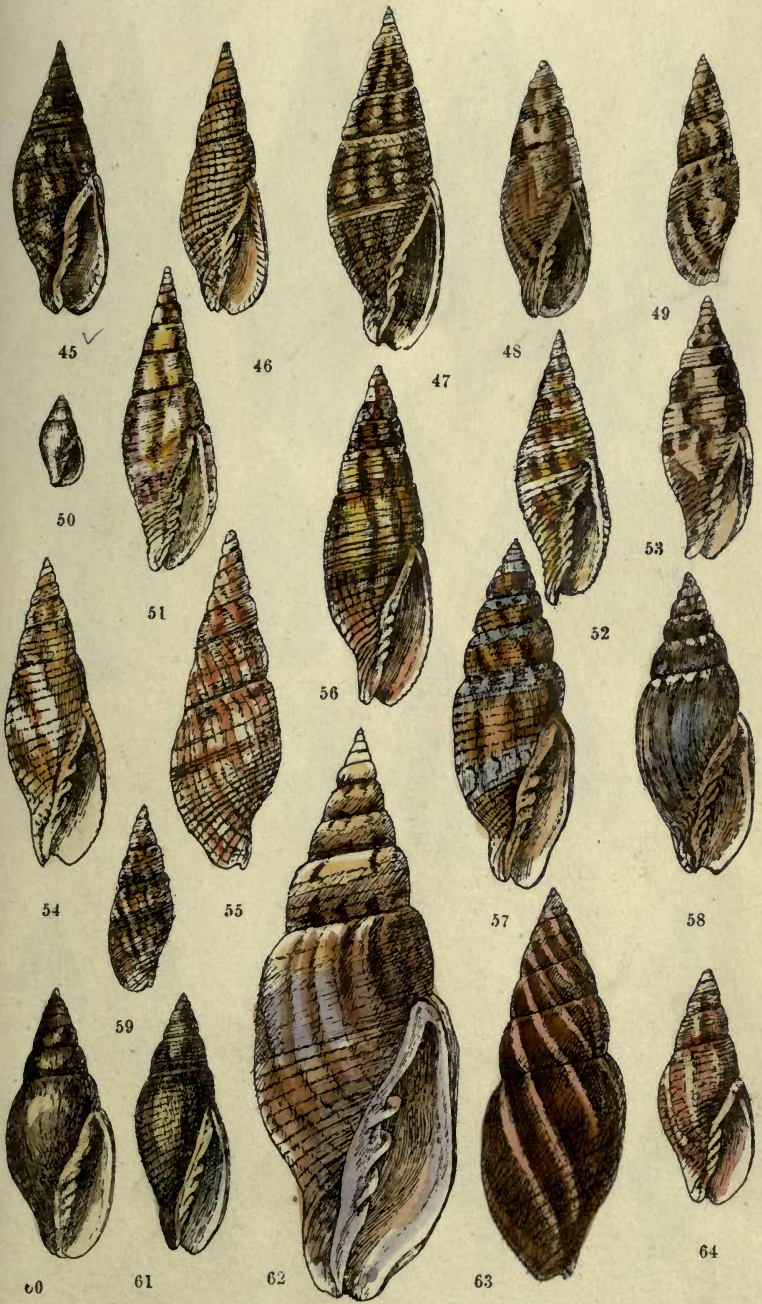
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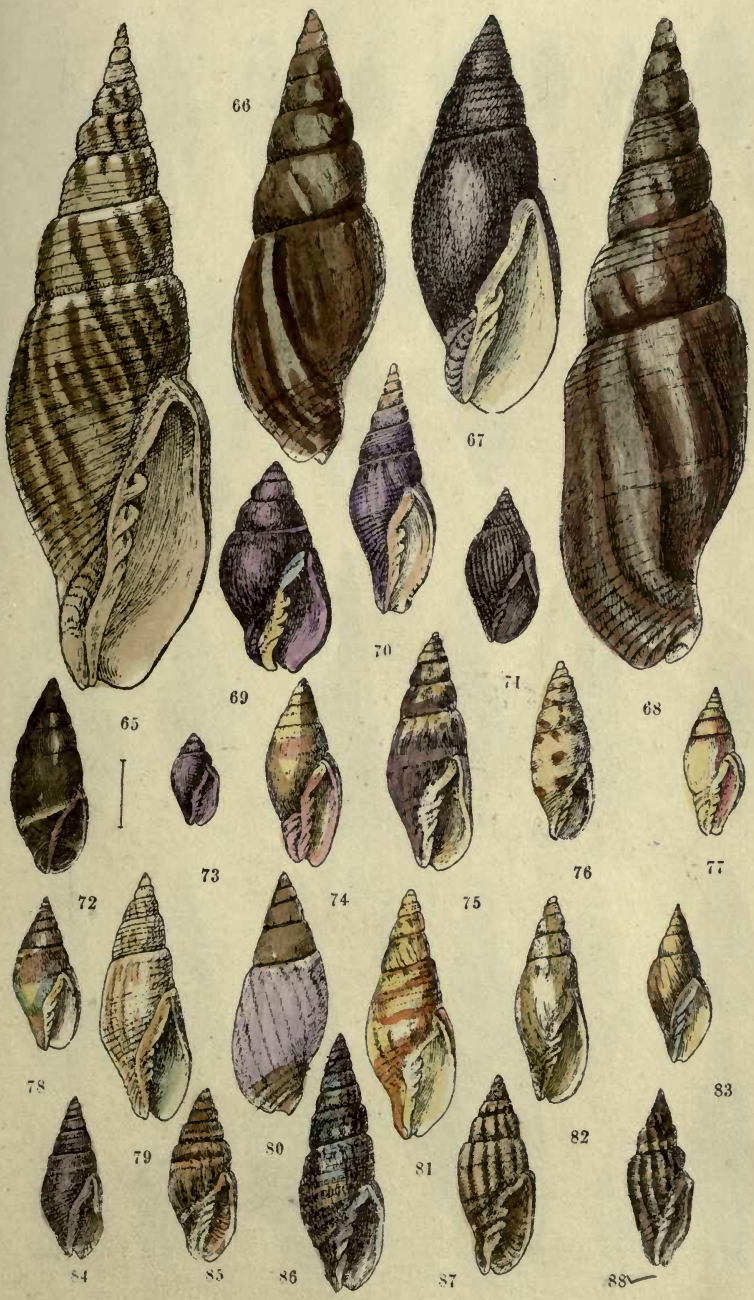
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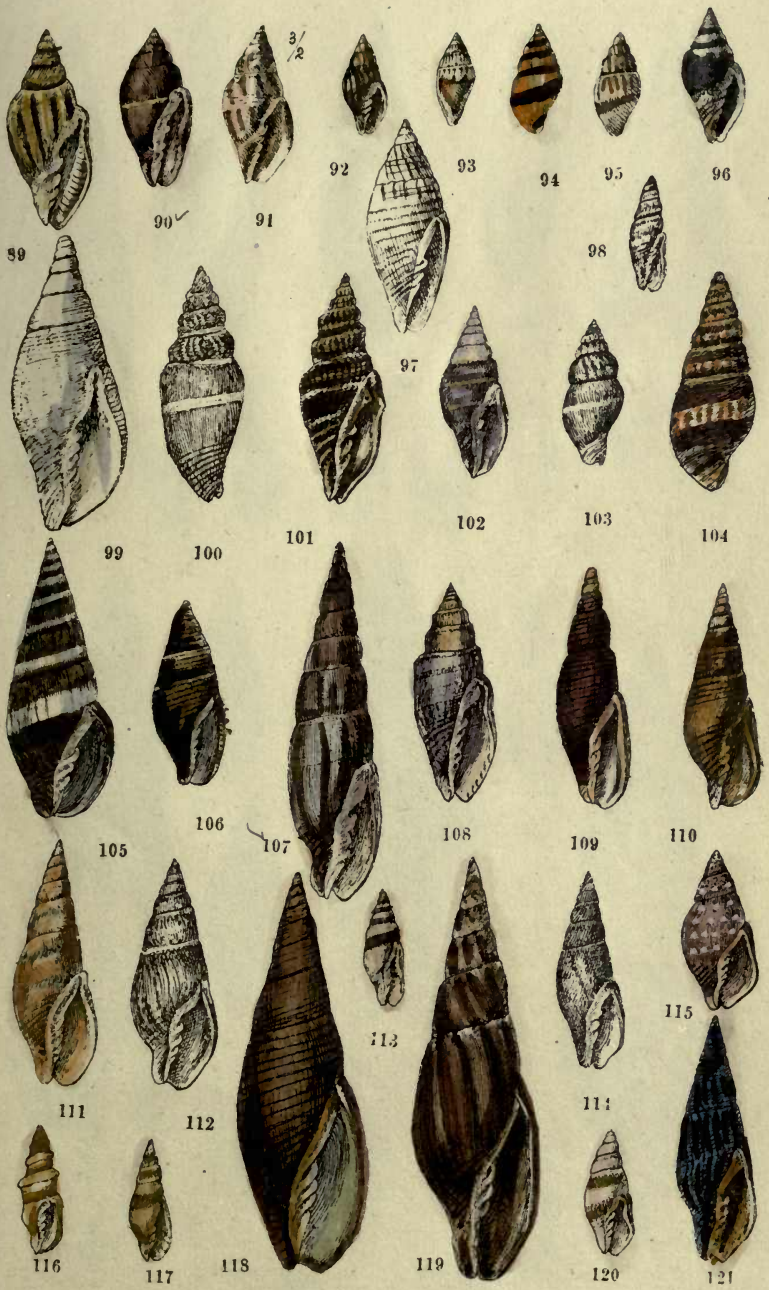
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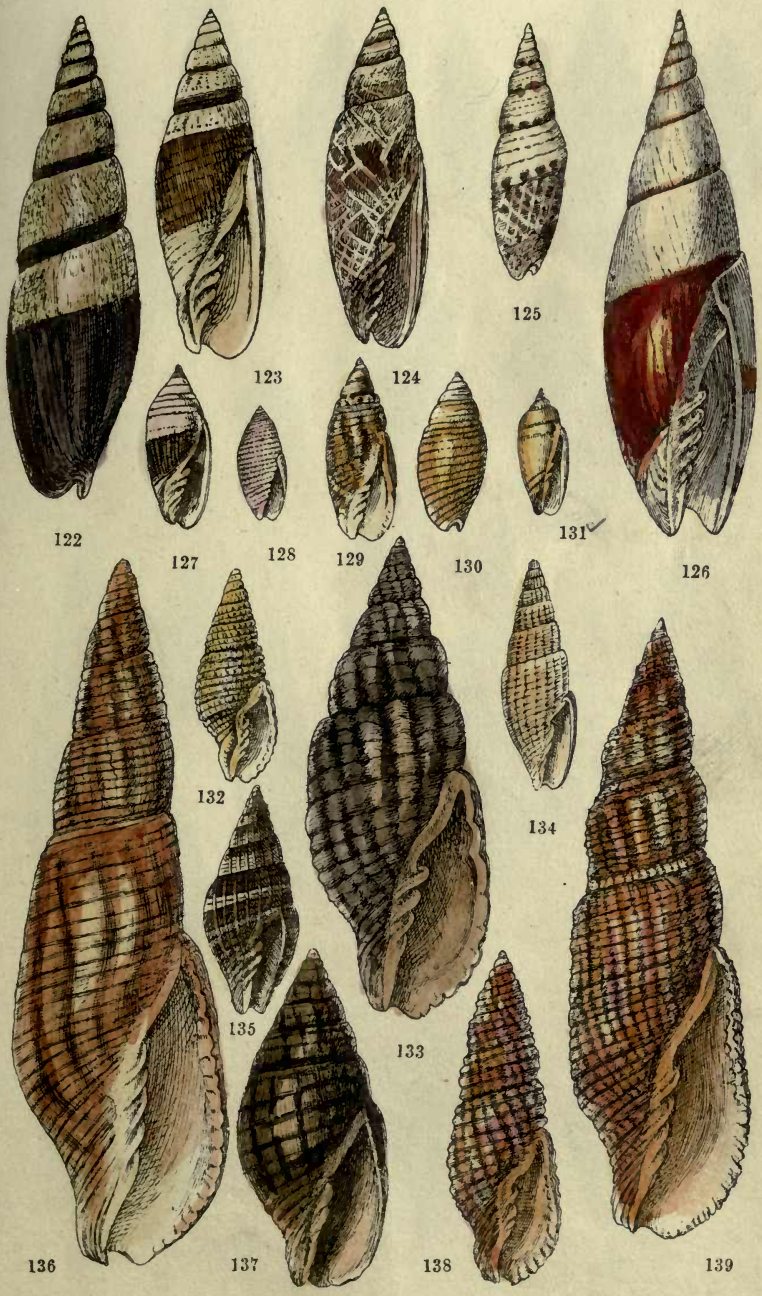
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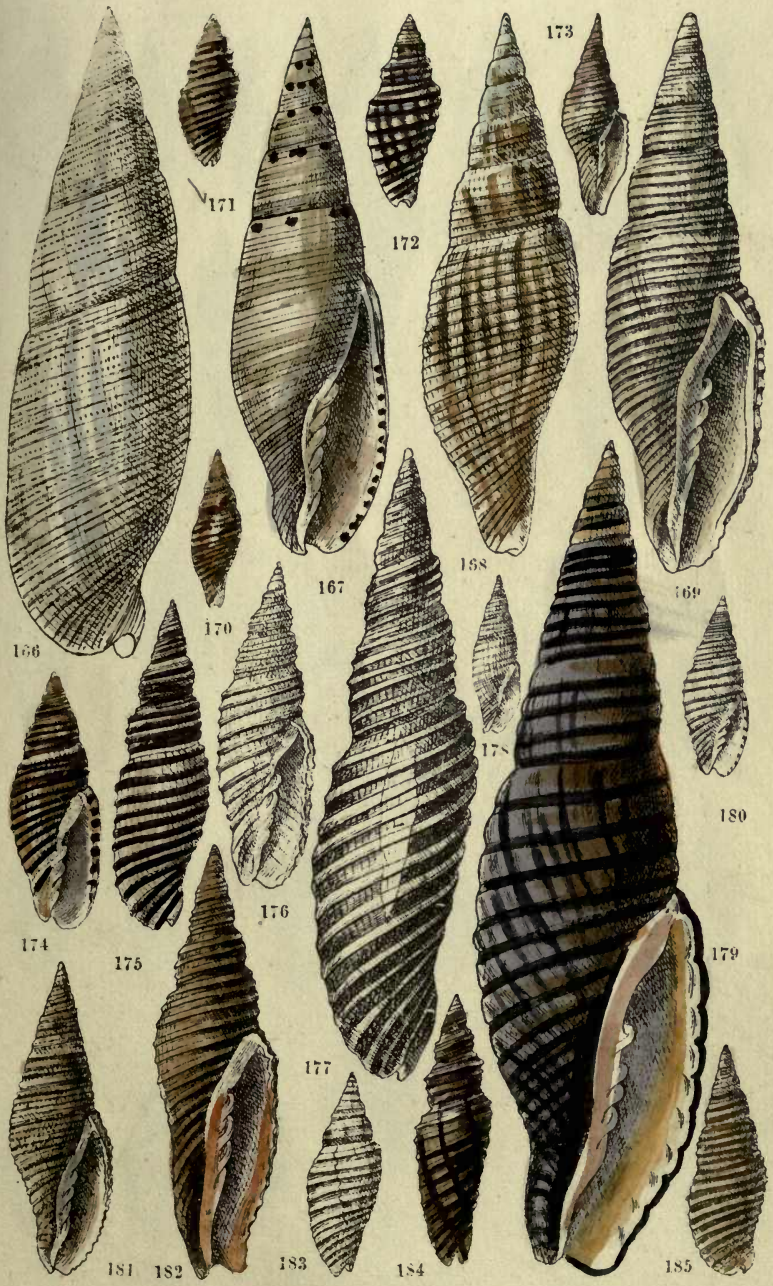
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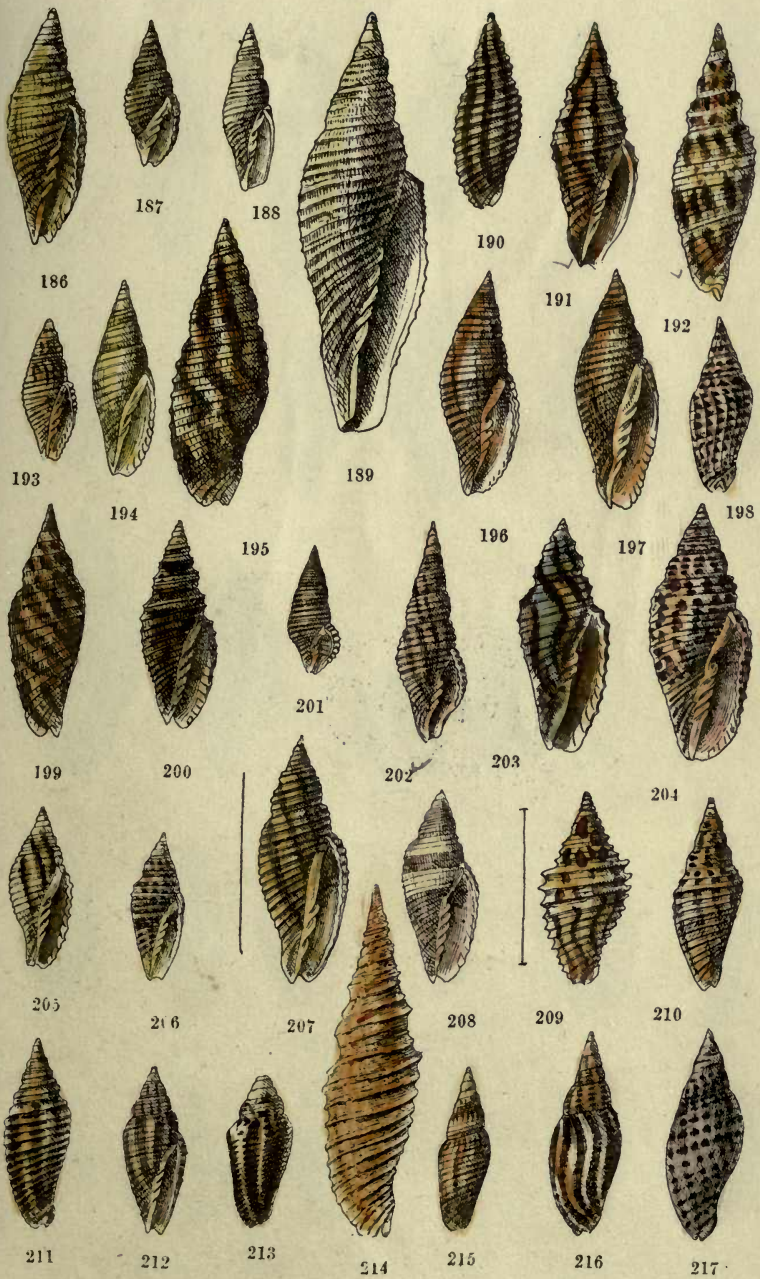
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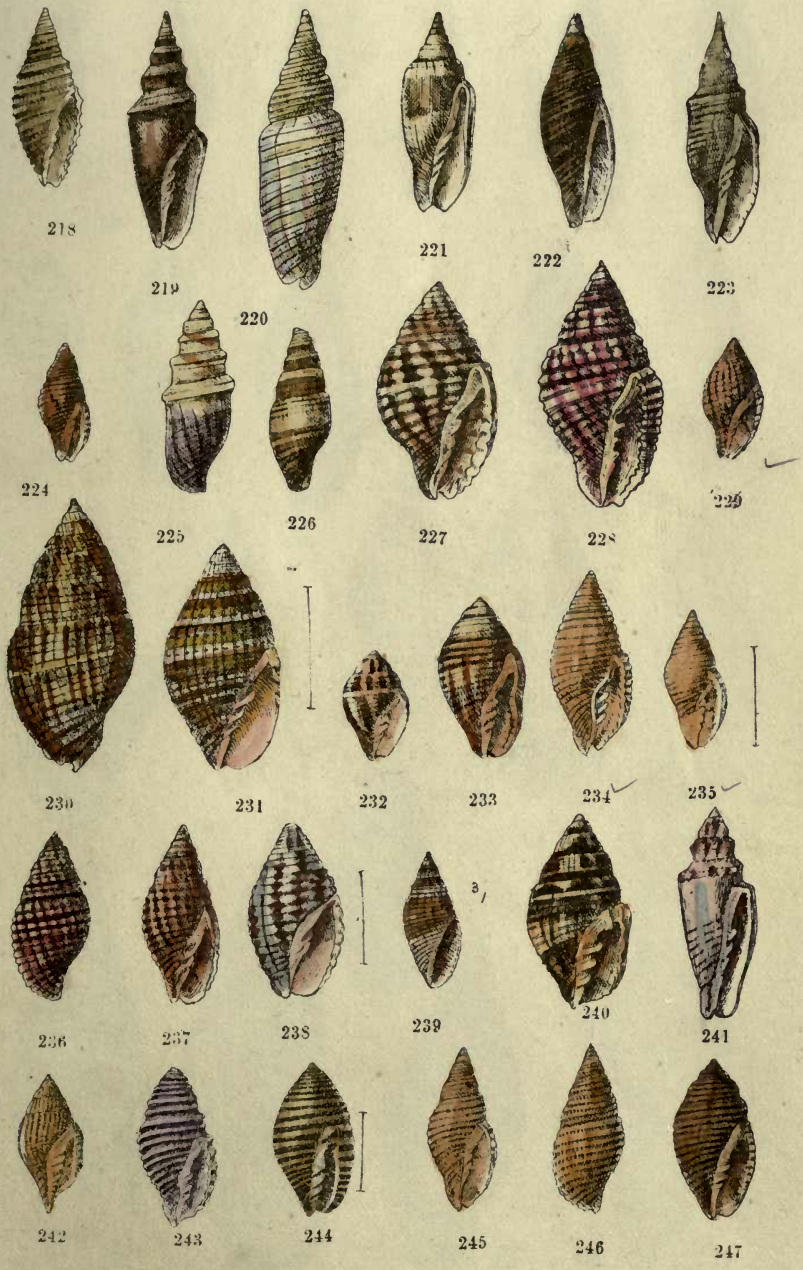
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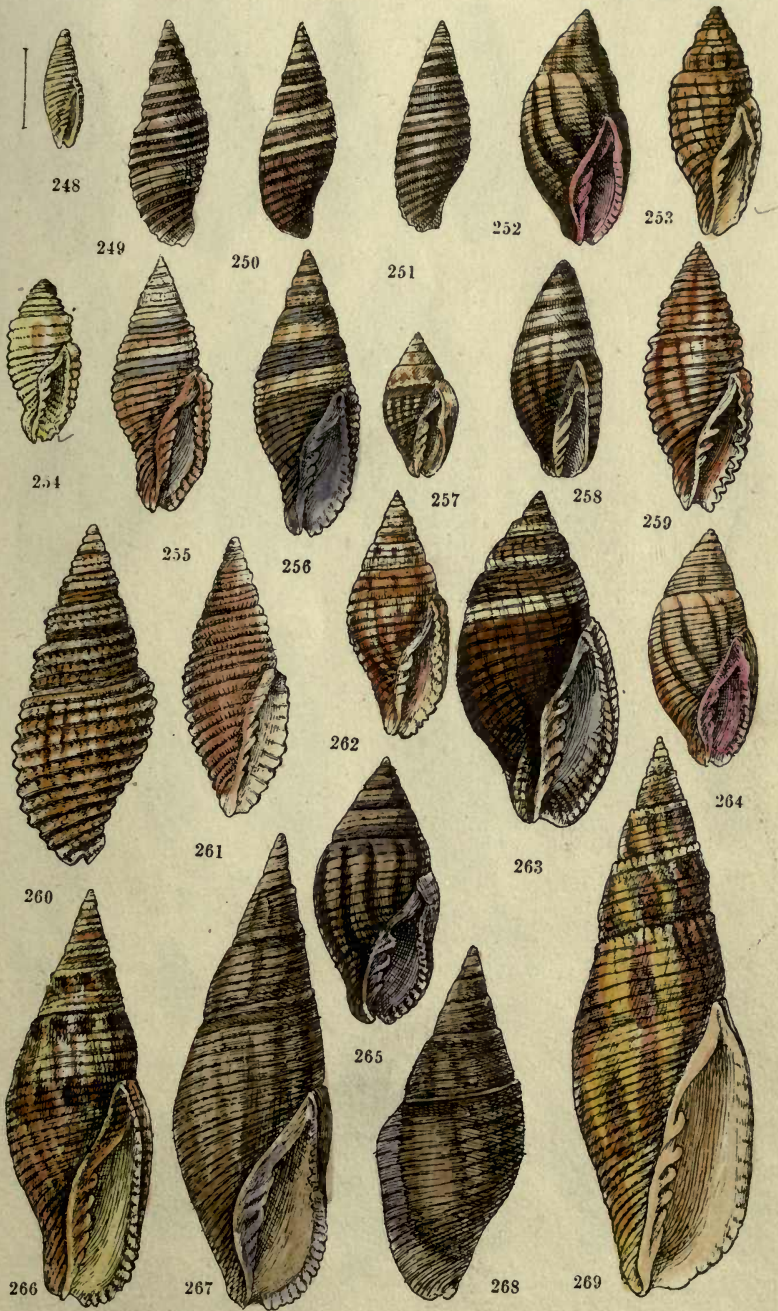
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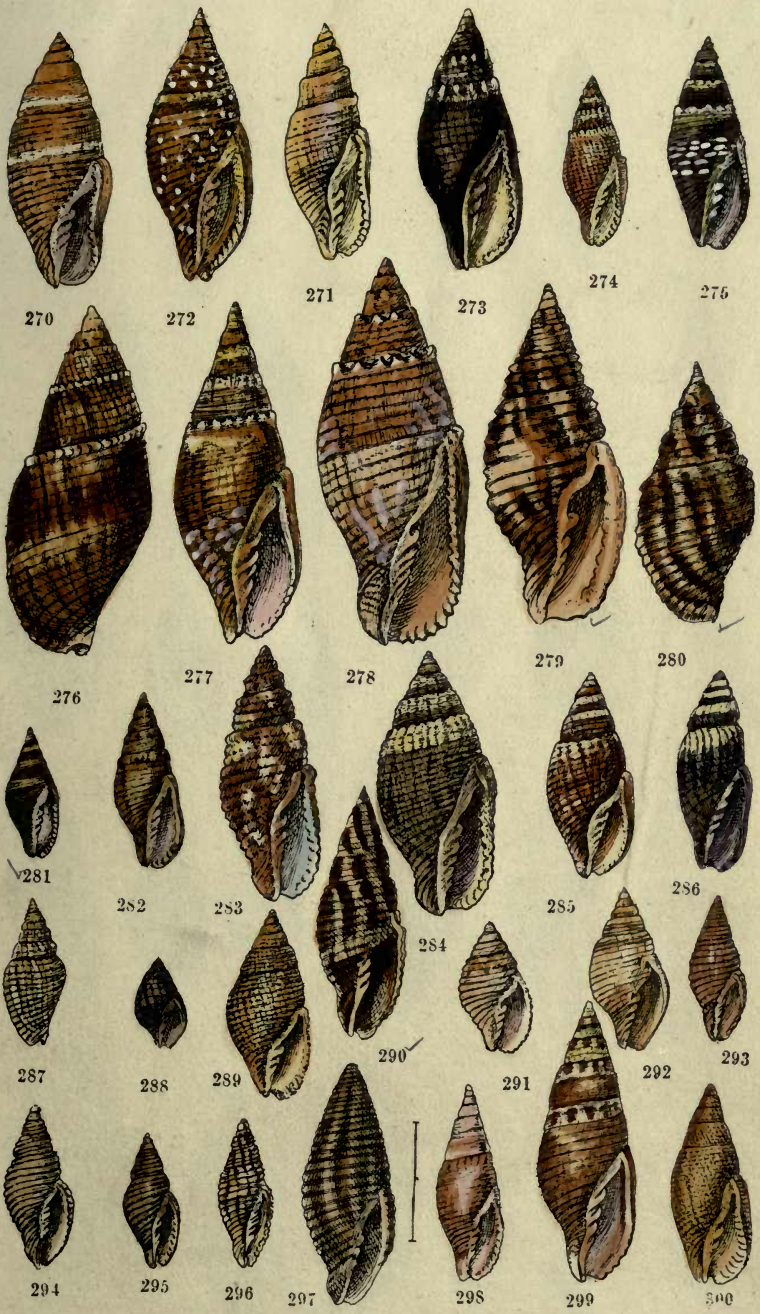
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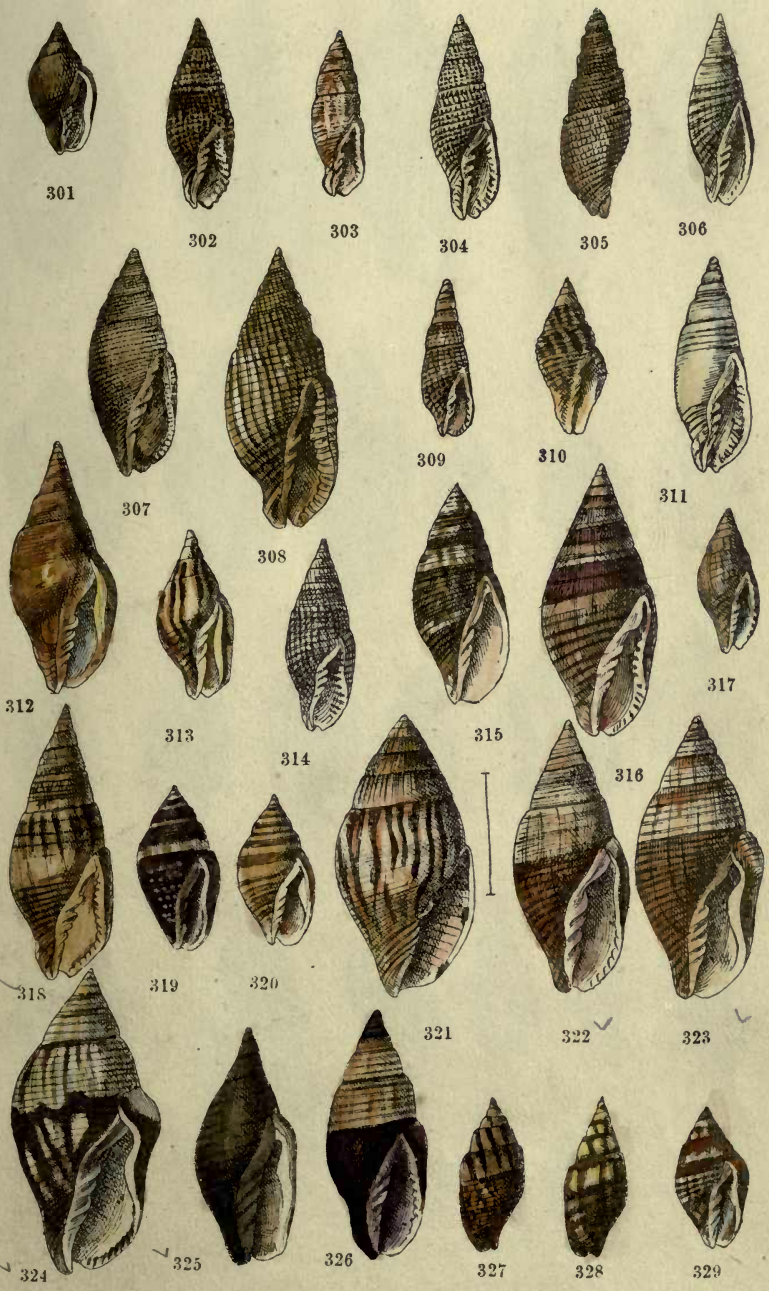
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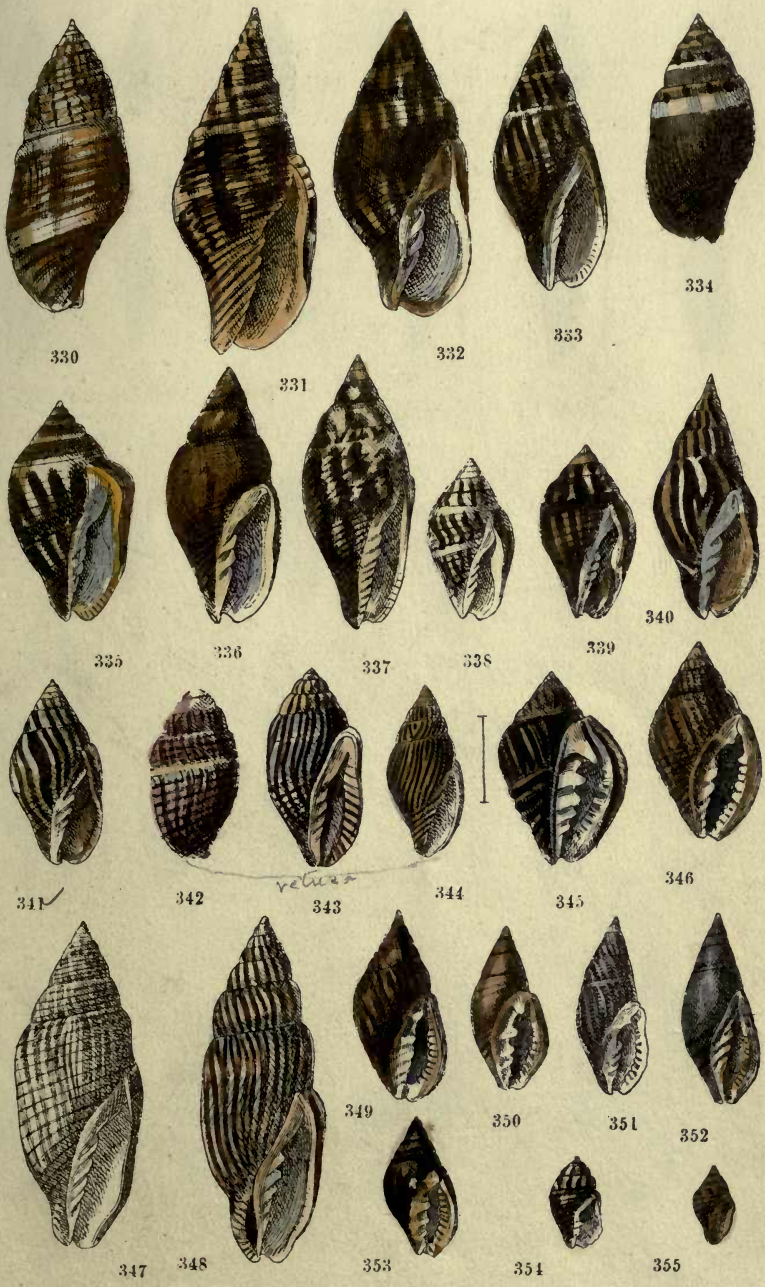
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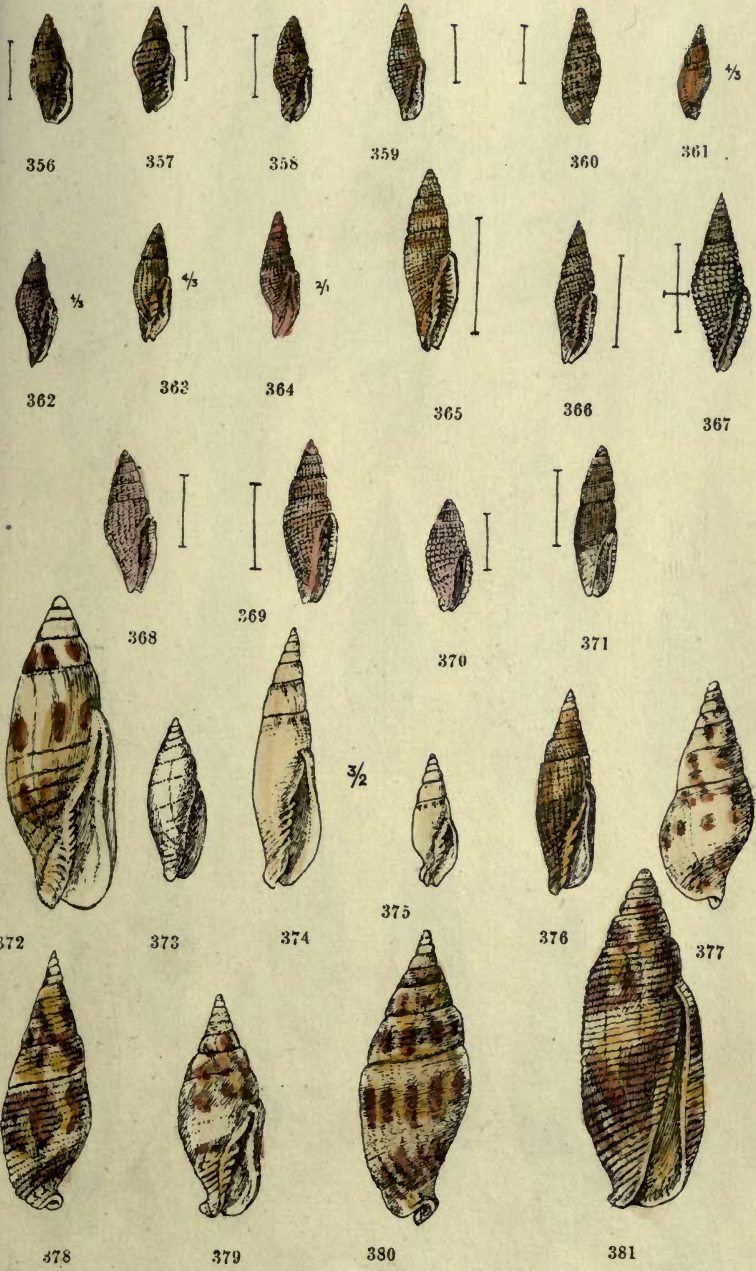

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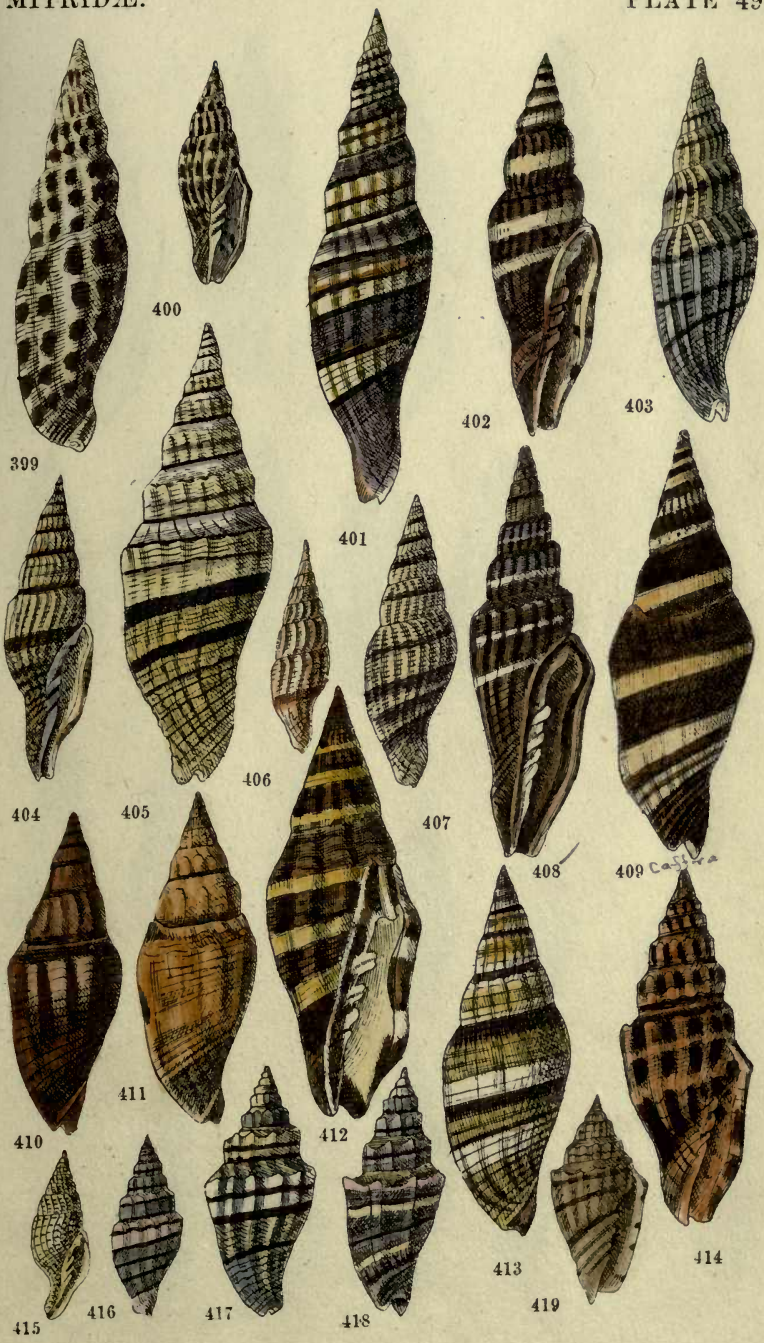
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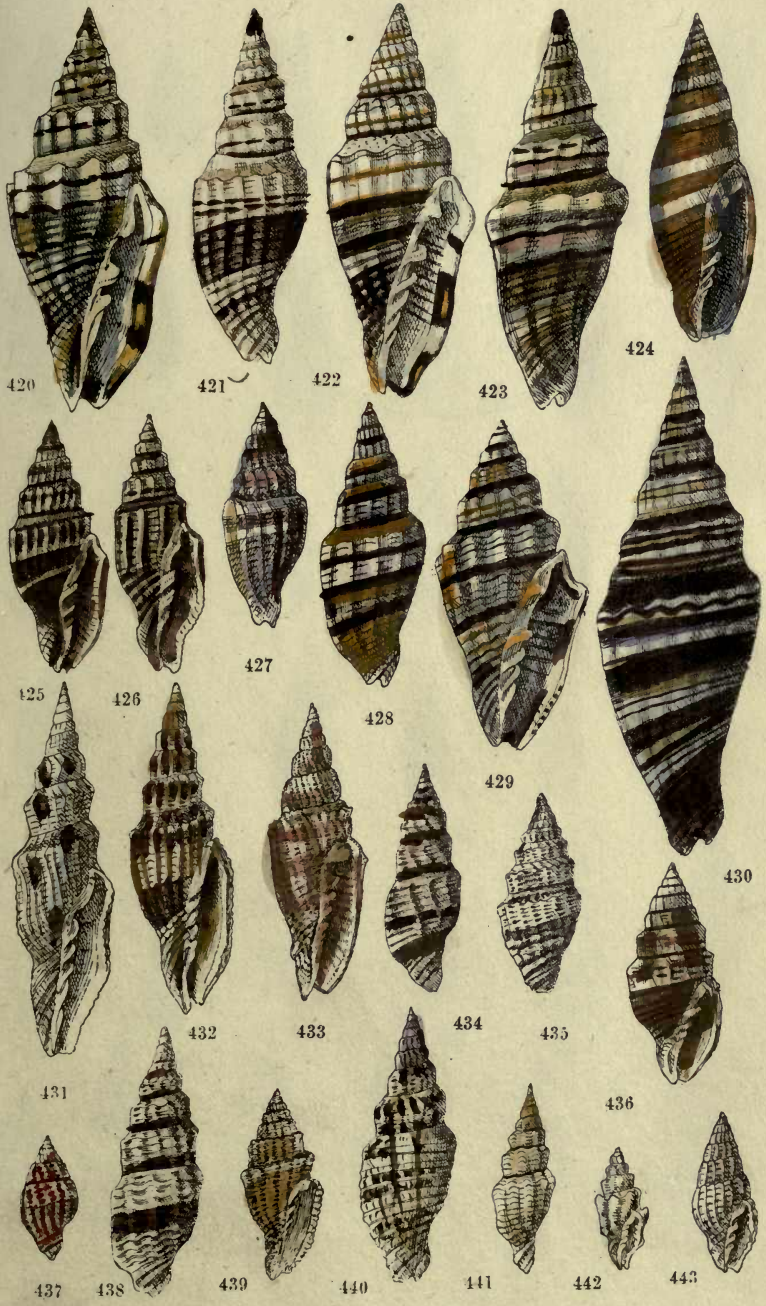
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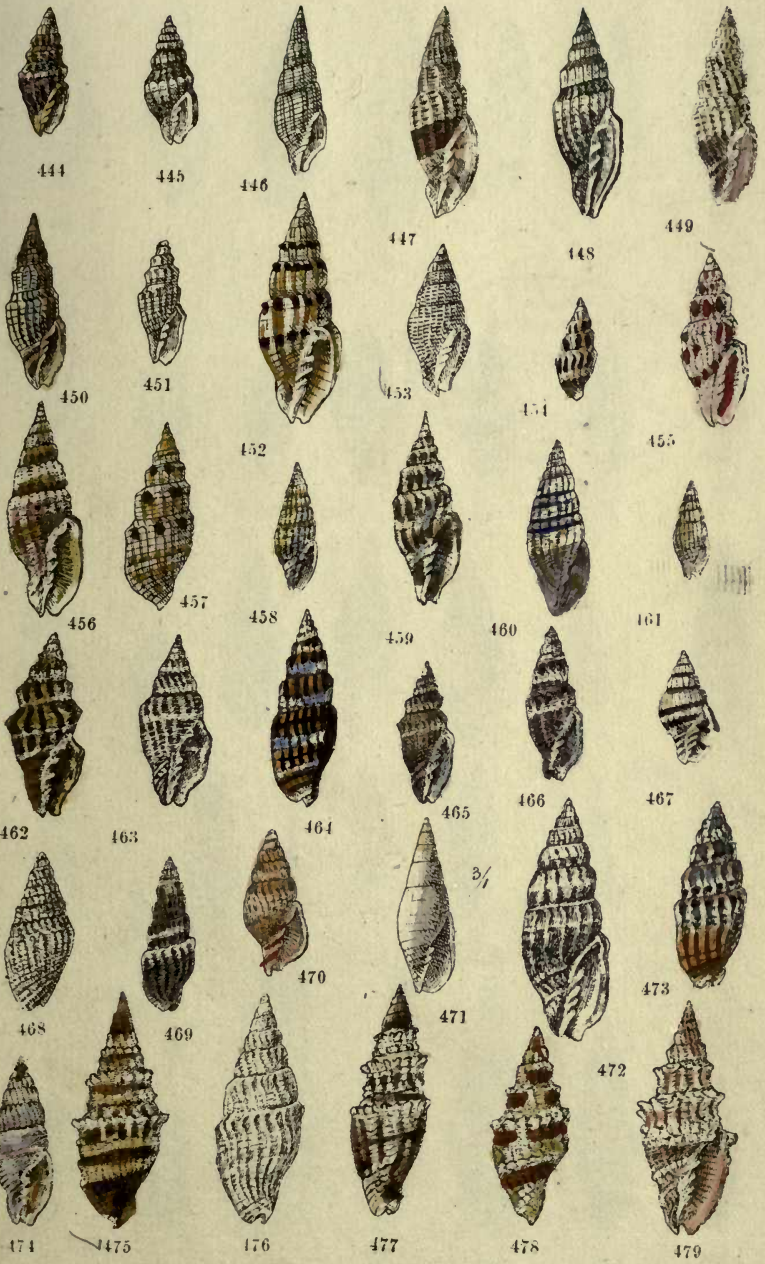
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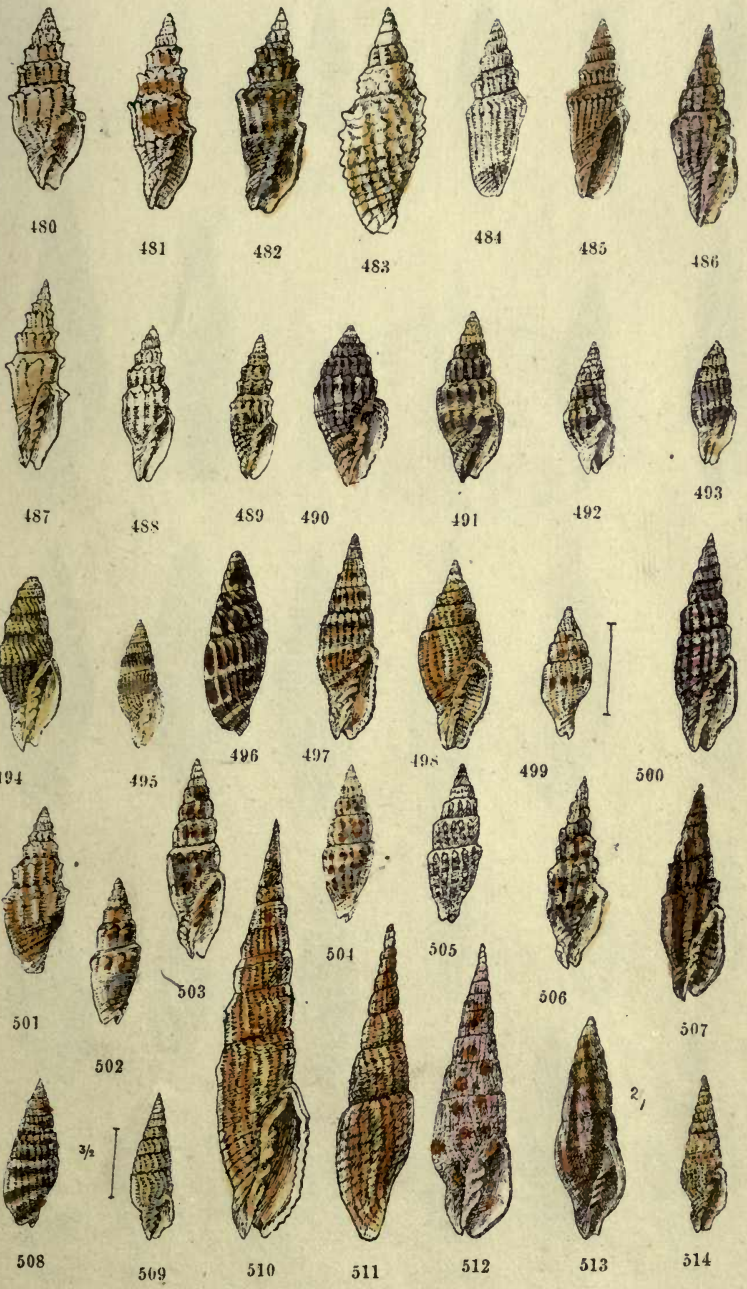
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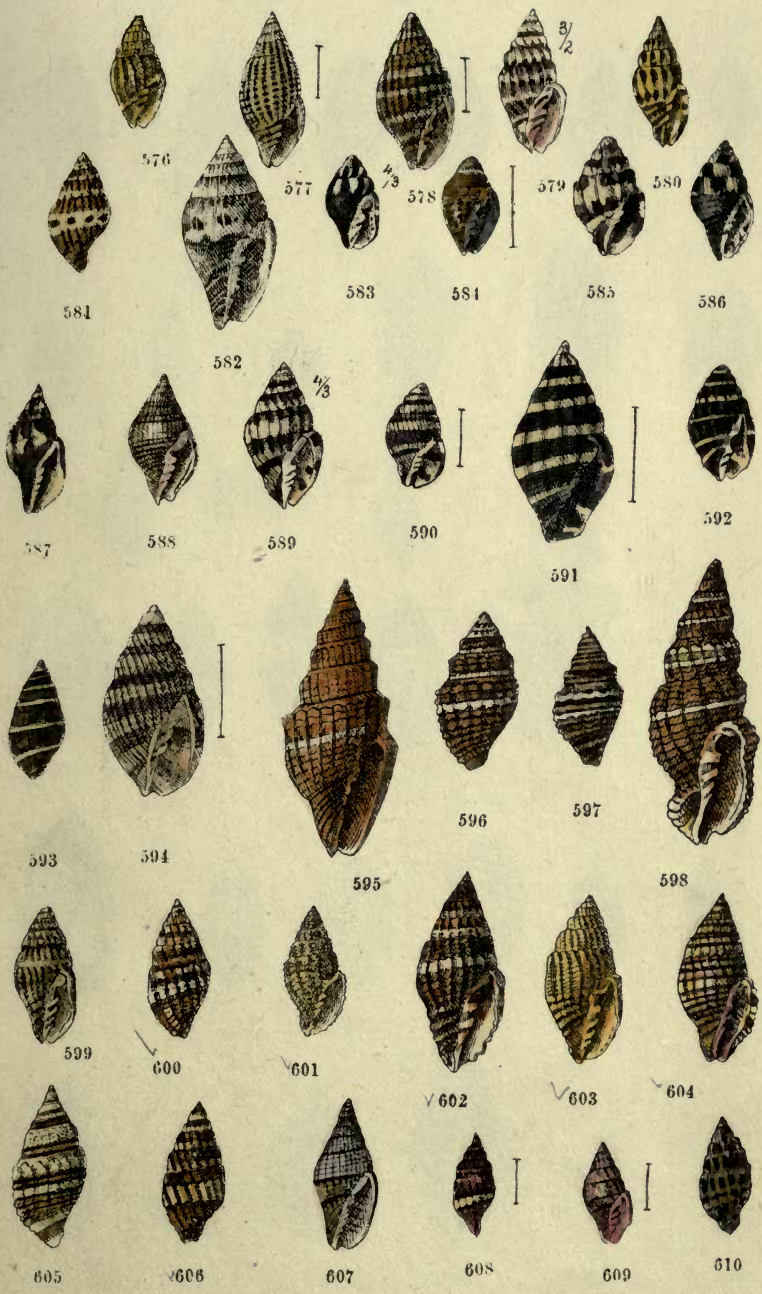
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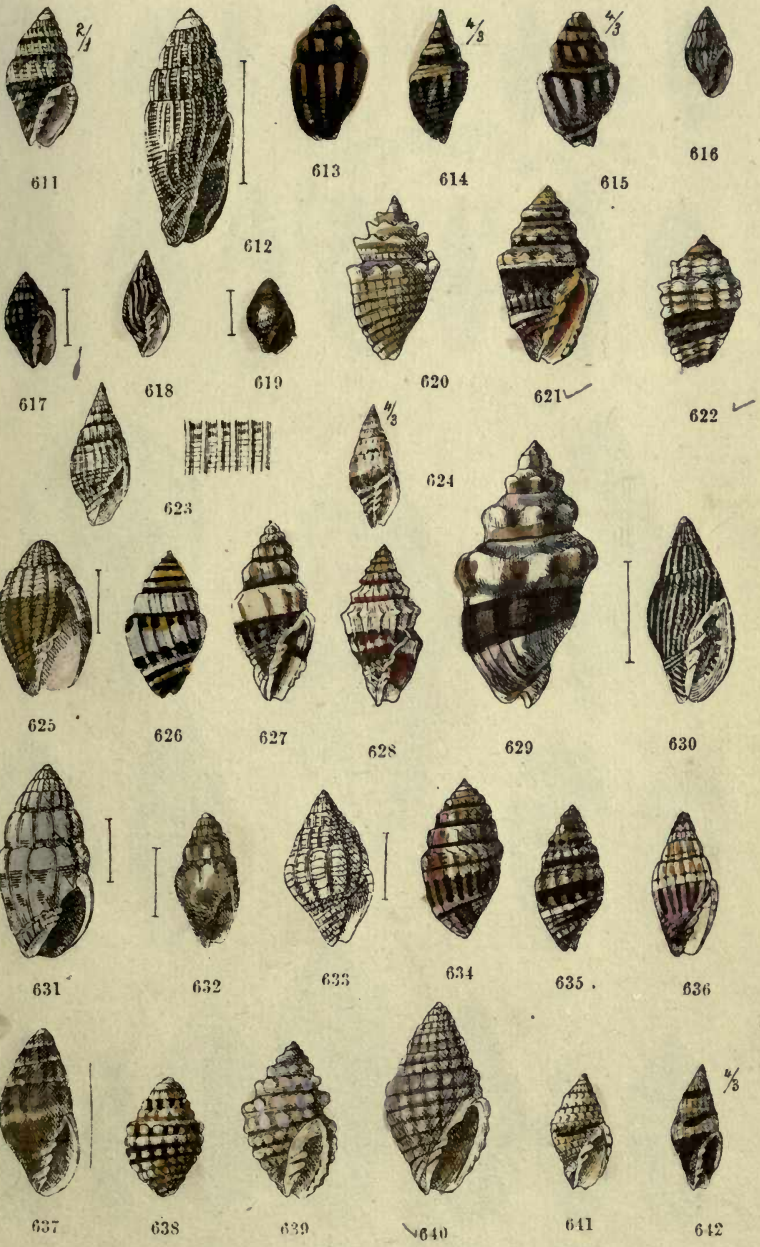
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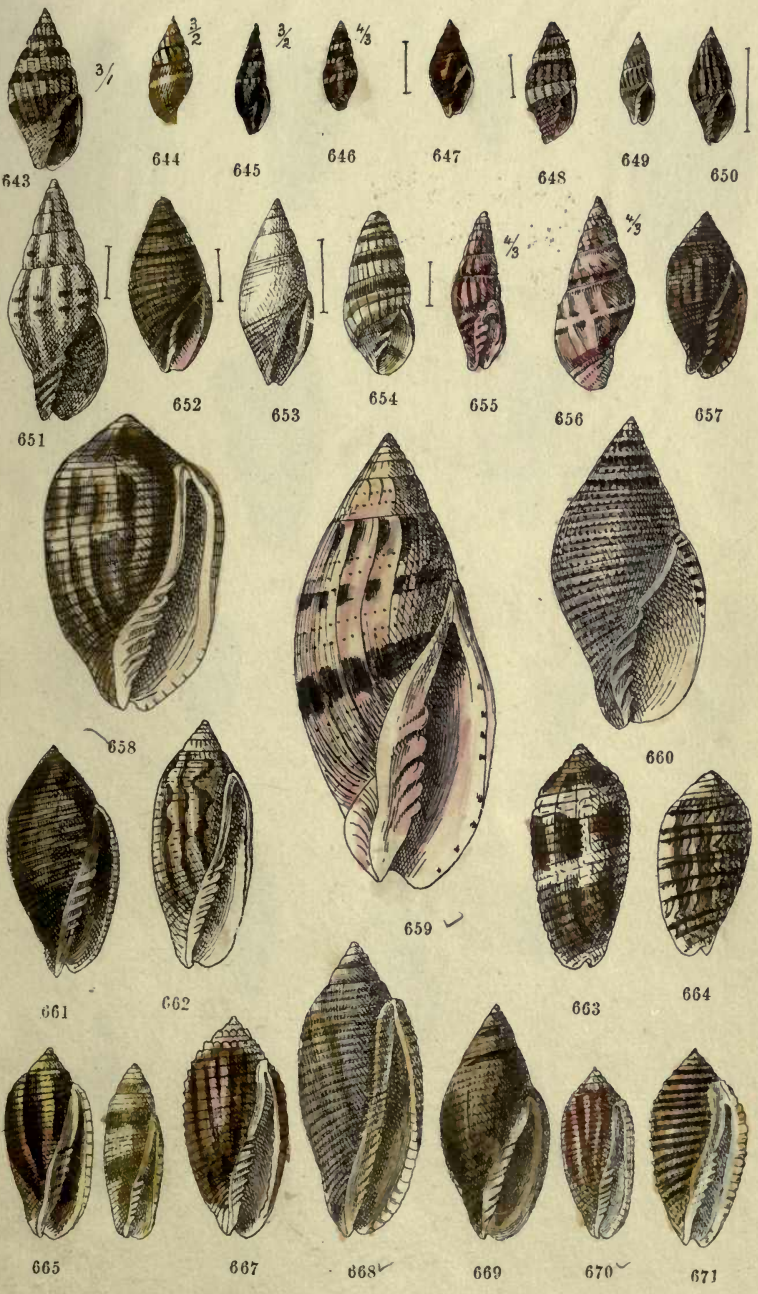
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